

# **Cosmetology**

***Textbook for the 2nd-year dentistry students  
(English medium)***

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ**  
**Харківський національний медичний університет**

## **Cosmetology**

***Textbook for the 2nd-year dentistry students***  
***(English medium)***

## **Косметологія**

***Навчальний посібник***  
***для студентів II курсу***  
***стоматологічного факультету***  
***(англомовних)***

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A textbook Cosmetology for stomatological faculty students of medical university. The issues of etiopathogenesis, clinic, diagnostic, treatment of dermatocosmetics pathology are shown in textbook.

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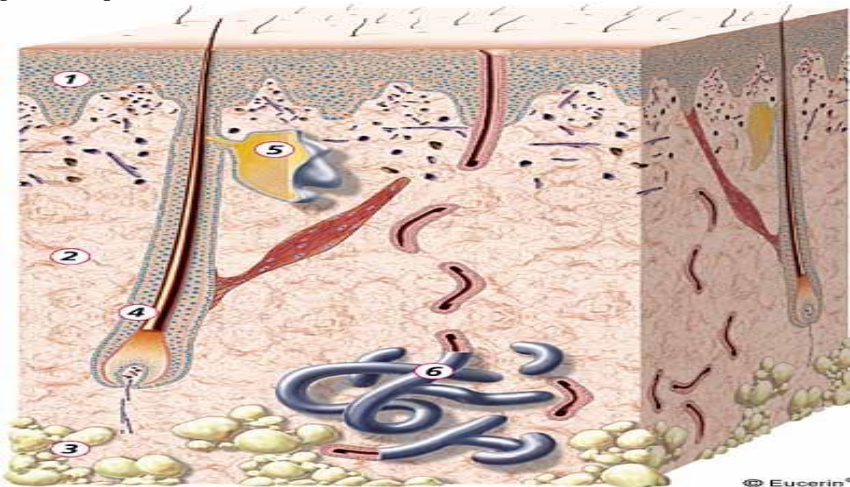
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## STRUCTURE, FUNCTIONS OF THE SKIN. TYPES OF SKIN. INTRODUCTION TO MEDICAL COSMETOLOGY

Many characteristics of the body are reflected in the skin, gender being a prominent one. Genetic and hormonal differences affect skin structure and function, resulting in variations between women and men and causing these gender variations to change with age. In addition, exogenous factors differ according to differences in lifestyle between the sexes. The skin of men is thicker across the entire age range of 5 to 90 years. Hormonal influence on skin thickness was demonstrated when conjugated estrogens were given to postmenopausal women.



**Fig. 1.** Structure of Skin:

- 1 – Epidermis. 2 – Dermis. 3 – Subcutis. 4 – Hair follicle.  
5 – Sebaceous gland. 6 – Sweat gland

*Epidermis.* It is a stratified epithelium undergoing kerataization, and consists of the following layers:

1. Germinal layer (*stratum basale*).
2. Prickle of coil layer (*stratum spinosum*).
3. Granular layer (*stratum granulosa*).
4. Stratum lucidum.
5. Horny layer (*stratum corneum*).

All these layers are well pounced on the skin of palm and sole, the stratum lucidum is not found on the face, chest or the flexor surface of the limbs. Stratum granulsa is found in the areas formed of a single or sometimes of interrupted raw cells. Stratum basale – is the inner most layer of the epidermis and borders directly upon the dermis or the true skin, it consist of a single layer

of columnar cells arranged like a palisade between these cells there are spaces called inter-cellular bridges.

*Dermis or the true skin* is localized between the epidermis and the subcutaneous fatty tissues. It is divided into two papillary and granular layers. Papillary layer is that part of dermis which is found between the epidermis and the superficial network of the blood vessels. The reticular layer merges with the subcutaneous fat. The true skin is composed of a fibrous substance, collagen, elastic, and argirophil (precollagen fibers), and a structural amorphous interstitial substance that is found between connective tissue fibers. The dermal papillary layer consists of thin bundles of collagen fibers and many fine elastic and argirophil fibers in the reticular layer the collagen bundles are more compact and thicker and they intertwine into a thick network of loops of collagen bundles determine the mobility of the skin over the underlying tissues and organs.

Skin collagen and collagen density were measured in addition to dermal thickness. Density was measured in addition to dermal thickness. The skin of men demonstrated a gradual thinning with advancing age (12–93 years), whereas the thickness of women's skin remained constant up until the fifth decade, after which it decreased with age.

*Hypodermis* is the deepest part of the skin (subcutaneous tissues) and consists of thick bundles of collagen and elastic fibers, stretching from the reticular layer of the dermis and forming a wide loop reticulum in which there are accumulations of large amounts of fatty tissues. The fat cells are almost completely formed of large drops of fat which displace the cell's nucleus to the periphery with very small amounts of protoplasm. The skin fascia which is a thick layer of connective tissue plate is also part of the hypodermis and other fuses with the underlying periosteum or aponeurosis of the muscles and forms single structure bundles of connective fibers stretch from the superior surface of the fascia to the dermis and form reticulum.

*Accessory organs of skin:* Glands (sebaceous, sweat gland). Hair. Nails.

Skin functions:

- Provides a protective barrier against mechanical, thermal and physical injury and hazardous substances
- UV photoprotection
- Prevents loss of moisture
- Sensory organ (touch, detects temperature)
- Regulate of temperature
- An immune organ to detect infections etc.
- Production of vitamin D.

The skin mainly intends to protect human beings against environmental aggressions. It fills this "barrier" part through a complex structure whose external part is made up by the stratum corneum – a horny layer covered with a hydro-lipidic protective film. This function is only ensured when this horny layer made up of the accumulation of dead cells is properly moisturized as the water is the keratin

plasticizer. The underlying epidermis also enables to reinforce the skin's defense capacity by ensuring the continuous and functional regeneration of the surface state (keratogenesis) and skin pigmentation (melanogenesis). The dermis also plays this part and appears as a nutritional structure whose function is also particularly important for the maintenance, coherence, elasticity, and thermoregulation of the whole skin. Finally, the hypodermis has a protective and reserve function.

Among the numerous skin classifications that are proposed, the one most closely connected with cosmetological requirements distinguishes *four different types: normal, oily, dry, and mixed*. However, in practice, such a classification just be used cautiously. In fact, the words used are ambiguous and lead to various interpretations; the criteria of selection to define each category are difficult to standardize since they vary from one case to another, some observations can even or respond to opposite clinical profiles. So, for example, severe changes in epidermal water content associated with superficial pH changes can modify the skin's appearance and lead one to establish a visual diagnosis of dry skin, whereas it may be actually an oily skin. From now on, more recent works would lead to progress significantly, but presently the different classifications taken as the authority are still based on the clinical observation instead of being based on the measurement of the biological parameters involved. Dry skin would mainly correspond to structural and functional modifications of the components of the epidermis. Oily skin would result from an excessive seborrhic production, invading skin surface and possibly hair. Resulting from totally independent processes, oily skin and dry skin therefore correspond to two states that must not be opposed to each other, as some skins can be "dry" or "oily" and dehydrated at the same time. The biophysical characteristics of skin also vary according to sex and age and can differ for the same subject according to the anatomical site considered. Finally, the distribution of these different types of skin widely varies according to the ethnical group we are referring to.

**Normal Skin.** Contrary to all expectations, it is worth noting that there is no definition of normal skin, the latter being qualified in comparison with the other skin types: a normal skin is not a dry skin, not an oily skin, not a mixed skin, and no more a pathological skin. A brief analysis of its structure and of its functions enables to draw a more positive definition of the normal skin. At the more external level, there is a very thin protective epithelium that constitutes the epidermis. However, the migration of the keratinocytes remains possible since these desmosomal ties are submitted to a continuous process of dissolution and reconstitution associated with a progressive decrease in their adherence strength. Keratinization corresponds to the most important structural and biochemical change that the epithelial cells undergo. Through this process they synthesize keratin, a fibrous complex protein whose structure evolves during cell differentiation. This process starts at basal level and ends with the transition between keratinocytes and corneocytes, which are cells mainly full of

a fibrous material. Corneocytes in degradation and intercellular lipids form a horny cover that reinforces the solidity and mechanical resistance of the stratum corneum, which also depends on the corneocytar supply in water.

In addition to this mechanical protection, the epidermis also has, through its structure and the presence of specialized cells such as the melanocytes, Merkel cells, and Langerhans' cells, other more complex functions, among which are the regeneration of tissue, the exchanges with the medium, and the active defense against external aggressions. At intermediate level, the dermis, a dense conjunctive tissue, is much thicker than the epidermis to which it is connected by the dermoepidermal junction, which is the area not only of cohesion but also of intense exchanges.

This conjunctive tissue is globally made up of an amorphous extracellular substance in which more or less mobile cells float, the whole being kept together by a frame of elastic and collagen fibers. Numerous vessels, nerve fibers, and appendices with main functions, notably the sweat and sebaceous glands and the hair follicles, go through the fundamental substance. The reticular dermis, thicker than the dermis and mainly made up of an interlacing of collagen fibers, is the place where the lower parts of the appendices are located, ensuring the hypodermal junction. It mainly has a mechanical function through its capacity for deformation (extensibility and compressibility). The papillary dermis, at the dermoepidermal junction, fairly loose, much vascularized, and rich in nerve fibers and endings. It therefore has multiple functions: enabling the nutritional exchanges with the epidermis and regulating the capacity for percutaneous absorption through its vascular and lymphatic networks, providing protection against aggressions and mechanical deformations through its fibrillar texture, ensuring sensory perception by the presence of most of the nerve endings, providing defense against foreign bodies by participating in the immune inflammatory and phagocytic processes through the existence of specialized cells, and maintaining tissue reconstruction.

Finally, at the most internal level, the hypodermis, which consists of loose conjunctive tissue, is linked to the lower part of the dermis by expansions of collagen fibers and elastic fibers of different thickness according to the anatomical areas. This tissue mainly contains adipocytes full of triglycerides, histiocytes, and mast cells. Its vascularization and innervation also vary according to the anatomical locations. In fact, it has been observed that the cicatricial elimination of the hypodermis results in a significant increase in the constraints of skin extension or friction due to a loss of mobility. Therefore, considering its structure and its functions, a normal skin should be a smooth skin, pleasant to touch, because of the cohesion of the cells of its more superficial layers; a firm and supple skin because of the existence of a dense supportive tissue and of the presence of numerous elastic fibers of good quality; a mat skin through its balanced seboreic production; a clear and pinkish skin because of the perfect functionality of its microcirculatory network. At

cosmetological level, we must be content with a less strong definition and consider normal skin as a young skin, structurally and functionally balanced and requiring no care apart from those necessary for its cleaning.

**Dry Skin.** The concept of dry skin has also never been clearly defined. The term “dry skin” conceals several complementary or opposite points of view. It remains completely different from the way it is approached. People connect this notion to the effects observed and to their sensorial dimension. Therefore, for them it is first of all a feeling of drying along with loss of skin suppleness and elasticity, characterized by a rough appearance often associated with an biophysical characteristics of the skin in relation to race, sex, age, important desquamation, and leading to a certain discomfort they intend to correct by using moisturizing products. For the biologist, the xerosis would be first the consequence of a change of the coherence and functionality of corneocytes, the water deficiency of the superficial layers of the stratum corneum, when it exists, only resulting from it. As a matter of fact, the physiopathogeny of most xerosis is still badly known, and it remains difficult to distinguish the causes from the consequences of these skin abnormalities.

As it has been said before, in normal condition, the corneal layer is made up of a regular assembly of corneocytes, forming a structure of modulated thickness with unique physical qualities. Each corneocyte contains dampening substances called NMFs (natural moisturizing factors), resulting from the enzymatic degradation of the fillagrin, which fix a certain quantity of inter-corneocytar water and therefore exert a decreasing osmotic pressure as they migrate to the surface. Any decrease in the enzymatic function therefore plays an important part on the NMF content and consequently on the osmotic pressure and on the opening of corneosomes, consequently easing a disorganized desquamation as it is observed with xerosis.

This dysfunction actually depends on a qualitative and quantitative change of enzymes and/or on an inadequate change of the pH of the corneum. The inter-corneocytar cohesion also depends on a complex mixture of lipids that constitute the lamellar structure interposed between the corneocytes (made up of fatty acids, sterols, and ceramides coming from the keratinosomes).

Previous studies have shown the importance of four factors predisposing to dry skin: 1. the lack of water of corneocytes, directly depending on the presence of NMF; 2. the epidermal hyper-proliferation, resulting from a deficiency in the renewal process of the keratinocytes; 3. the change of lipidic synthesis is at cell level; and 4. the deterioration of the functionality of skin barrier, following a degradation of intercellular cohesion. All these factors are inter dependent.

Consequently, dry skin should be characterized by its rough appearance, without referring to its hydration level. On the other hand, the use of specific inhibitors of tryptic proteases, and particularly of “plasminogen activation system,” showed a capacity for restoring the normal state of the skin and for simultaneously suppressing all the changes related to skin drying, notably against the mechanisms



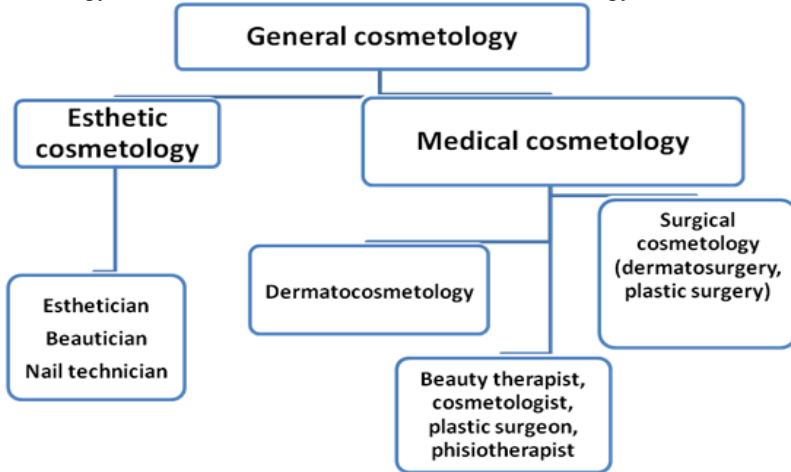
of cell regulation and differentiation, of increase in transepidermal water loss of the horny layer, of acceleration of its renewal, and the epidermal thickness resulting from it. From now on, these works enable to confirm that skin drying does not correspond to an irreversible state but results from a dysfunction involving the traditional “balance moisture theory” and the “protease regulation theory,” resulting from these new research. As already seen, dry skin depends on numerous biological factors; its reparation implies the restoration of the epidermal barrier, actually damaged by the loss of fat and dehydration of the superficial layers of the stratum corneum. Such changes are more easily objectivable in African-American subjects in whom the skin takes a perfectly visible ashy appearance.

**Oily Skin.** Whereas dry skin reflects a functional change of different skin components, the oily skin results from an over activity of the sebaceous glands, leading to an over production of sebum overflowing on the skin, giving it a characteristic oily and shiny appearance. In fact, sebum results from the disintegration of specific cells, the sebocytes, a short time before they are secreted from the sebaceous gland. Once again it results from a cell differentiation. Originally, sebum contains squalene, waxes, triglycerides, and sterols. Under the effect of resident bacteria, one part of the triglycerides is immediately hydrolyzed, and the main part of the cholesterol is esterified, the sebum excreted containing a significant quantity of free fatty acids contributing to the acidity of the pH of the skin surface. Then this sebum blends with epidermal lipids produced from the destruction of the desquamated horny cells that also contain triglycerides and cholesterol to form the surfacelipidic film covering the stratum corneum. The production of sebum is more important on head, face, neck, shoulders, and thorax, areas where a hyperseborrhea can be the conjunction of a high production of the glands and of a greater number of glands. Sebum is a natural skin detergent that gives the skin an amphiphilic wettability through the presence of free fatty acids and wax. It also plays a part in the maintenance of the functional qualities of hairs, a fungistatic activity, while having a nutritional function for bacterial species useful for the organism, and finally, a protective function against excessive dehydration in a dry environment through its effect on the epidermal barrier function, even if the sebum is not known to have a dampening activity and has no influence on the skin's hydration level. The change of its rate of production depends on genetic, endocrinic, and environmental factors. The opposite of oily skin would not be dry skin since they can coexist, for example, on face. Such a statement is currently supported by many workers. Actually, young children fairly never have seborrheic outbreak before the age of seven years, when the first secretion of androgenic precursors starts to form. This production will progress to reach its maximum at adolescence and then decrease with age. It is also worth noting the racial differences related to sex-men globally having an oilier skin than women. Finally, at cosmetological level, it must be retained that oily skin is sometimes erythrosic, easily irritable, and particularly fragile.

**Mixed Skin.** It corresponds to a complex skin where the different types previously described coexist on different areas of body or face. The characteristic example is the face, where solid and oily skin with well-dilated pores on the medio-facial area can coexist with a fragile skin with fine grainson cheeks. Such a skin requires conjugating the particularities and sensitivities peculiar to normal, dry, and oily skins.

**Modern cosmetology** is an in tegrated academic subject, which is on the border of many medical and pharmaceutical specialties: dermatology, surgery, endocrinology, physiotherapy, regenerative and prophylactic medicine, therapy, psychology, pharmacology and etc. The *aims of cosmetology* are maintenance and strengthening of health, education of cosmetic care culture, correction and elimination of the cosmetic affliction. *The tasks* of modern cosmetology are removal of the cosmetic defects and development of new therapy schemes and methods of cosmetological pathology treatment. *Objects of cosmetology* are person, skin and its appendages, methods of cosmetological correction. *Methods* of modern cosmetology are pharmacological, manual, cosmetics, cosmetological hardware, dermatologic, surgical and others methods of removal and correction of the cosmetic defects.

Modern cosmetology consist of two large groups: aesthetic cosmetology and medical cosmetology. Basic professional unit, working in the field of aesthetic cosmetology. Esthetician, in the field of medical cosmetology is a Doctor.



All of difficult, penetrable skin cosmetic methods are a sphere of activity of doctors (lasers, electrocoagulation, cryodestruction, dermabrasion, injection methods, deep peels, needle-shaped lipolipolys, rhidolys, electroepilation and other). All of other cosmetology devices are expected on esthetician, getting trade education. An esthetician specializes in the study of skin care, including

facials, body wraps (relaxing treatments which involve hot linens, plastic sheets, and blankets), salt glows (an exfoliation treatment), waxing as a form of hair removal, cosmetic make-up services and other services with advanced training. Estheticians may work independently in a spa or salon or may assist a doctor in his or her practice. An esthetician must be skilled in recommending skin and body care products and retailing them to their clients. An esthetician is not necessarily licensed in cosmetology, but is typically well versed in knowledge of skin care. In Ukraine of service in a medical cosmetology have a right to render only doctors with the proper special education (base speciality of dermatovenerology, improvement of cosmetology), passing attestation and getting the proper category on dermatovenerology (1 time in 5 years).

#### **Structure of cosmetic service**

- tan saloon
- tattoo saloon
- massage parlour
- beauty room
- beauty salon
- fitness centre
- wellness centre
- spa centre
- cosmetic clinic
- medico-cosmetic center

A cosmetic room is supposed by the lead through of elementary cosmetic procedures: programs on the prophylaxis of senescence of skin, massage and wrappings, cosmetic cleanings, depilation, correction of eyebrows and cilia. As a rule, the equipment of cosmetic room is included by a cosmetic arm-chair, vapazon or cosmetic combine, sometimes infra-red lamp, term blanked, sterilizer. The beauty saloon are most widespread, the spectrum of services of which is limited procedures of clearing of skin, massage, causing of masks, application of facilities of professional cosmetology. An apparatus room is presented vapazon, darsonvaler, phonophoresis, electrophoresis, ultrasonic peel, vacuum for a massage and cleanings, brushing, myostimulator, press therapy and other non penetrable apparatus. Fitness center consist of health center and beauty salon. Thus the special attention is spared procedures for the design of figure. Hairdresser services and manicure are claimed here too. Medical cosmetology centers and clinics are able to give a complex, high-professional help for diagnosing and treatment all cosmetic defects. They have a outpatient and inpatient units, operating room, reanimation box, where the dermatocosmetologist and plastic surgeons work.

**Features co-operating with the patient of cosmetology type:**

- Prevaling of aesthetic problem over medical
- Absence of vital indications
- Necessity for psychocorrection
- Obligatory prognosis of efficiency of cosmetology influences
- To explain to the patient in detail purpose of the conducted correction, mechanism of action of procedure, vehicle or preparation, advantages of this method, mode and duration, contra-indications, possible side effects
- Necessity of the informed consent

**Informed consent of cosmetic procedure of removal (corrections) of mimic wrinkles of person by injection preparation of Disport.**

- To recommendation to the lead through of procedure
- Conclusion of gynecologist about absence of pregnancy
- Not to accept antibiotics minimum 3 (three) days prior to procedure
- Not to conduct other injection methods last 3 weeks to procedure
- To recommendation after the lead through of procedure
- First 4 hours after procedure to save vertical position and not massage the point of introduction
- During the first days to accomplish active motions mimic muscles
- During 4 months not to apply antibiotics: tetracycline's, aminoglycosides, polymyxin

**Information about a side action**

- During a few days after procedure pain or sickliness is possible in the place of injection, appearance of hematomas, allergic reaction
- In rare cases (0.1 %) in connection with individual in sensitivity to botulotoxinum a cosmetic effect is not observed
- Weakening of near-by muscles, which passes through a few weeks, is possible on occasion

**Contra-indications**

- Enhanceable sensitiveness to the components of preparation
- An inflammatory process or damage of skin is in the place of injection
- Intensifying of chronic disease
- Myasthenia
- Treatment by antibiotics
- Hemophilia
- Pregnancy and lactation

I certify that acquainted (à) with the information resulted higher, understand setting of this document, got expels I am fully satisfied. I express the realized choice and voluntarily consent signing of this document to the lead through of procedure.

Date Signature

## AGING OF SKIN

Aging can be viewed as the accumulation of changes in cells and tissues resulting from a greater disorderliness of regulatory mechanisms that result in reduced robustness of the organism to encountered stress and disease. The notion of greater disorderliness in aging is illustrated by the erosion of the orderly neuroendocrine feedback regulation of the secretion of luteinizing hormone (LH), follicle stimulating hormone (FSH), adrenocorticotrophic hormone (ACTH) and growth hormone (GH). These changes are manifested as menopause, andropause, adrenopause, and somatopause. Skin aging is part of the slow decline in appearance and function that appears to be attributed in large part to the drastic decline of hormones in the body after adulthood. At the cellular level, several processes are involved in the physiology of aging and the development of some age-related diseases. The process of apoptosis signifies the process of nontraumatic and noninflammatory cell death. Dysregulation of apoptosis has been implicated in the increased incidence of cutaneous malignancies that are more prevalent in older individuals, such as basal cell carcinoma, squamous cell carcinoma, and malignant melanoma. Cell senescence limits cell divisions in normal somatic cells and may play a central role in age-related diseases. Telomeres are thought to play a role in cellular aging and might contribute to the genetic background of human aging and longevity. It has been speculated that the limited proliferation potential of human cells is a result of the telomere shortening that occurs during DNA synthesis at each cell division. Photoaging may accelerate the shortening of telomeres and push cells into senescence sooner. That could be the reason why various growth factors may affect the speed and quality of wound healing. Biochemical insults also arise within aging cells, in part from the action of reactive oxygen species generated and scavenged incompletely throughout the cell cycle. Aging-associated changes also occur between and among cells via alterations in the intercellular matrix, the intercellular exchange of trophic factors, the release of inflammatory cytokine mediators, and the degree of infiltration by other associated cell types. In addition, the quantity and distribution of various growth factors may affect wound healing. Decline of DNA repair in combination with loss of melanin increases the risk of photocarcinogenesis and can also cause the decline of enzymatically active melanocytes (10-20 % each decade) that contributes to increased sensitivity to ultraviolet (UV) radiation. However, it is not known why free radical damage does not adversely affect all of the body's cells (e.g., gonadal germ cells). An aging is a difficult inevitable multivariable process which takes place in all of tissues of organism, including in a skin. Both internal factors (heredity, stress, endotoxemia, related to pathology of internals, state of the immune and hormonal systems and other) and external (ultraviolet, unfavorable ecology,

allergens, smoking, alcohol, unreasonable nutrition, mechanical damages, toxic matters of cosmetics, gravity tension and other) influence on speed and intensity of aging. The mechanisms of aging until now are not exposed, although there is a great number of aging theories generally accepted from which it is been theory of Glycation by Maillard and Free-radical theory by Harman. Glycation is an important mechanism of aging. It is a nonenzymatic reaction between monosaccharides and amides of proteins. Essence of it consists in ability of albumens to associate with saccharides, and speed of reaction depends on the concentration of saccharides and reaction time. In addition, different factors (proteases, free radicals) affect albumens, do them more vulnerable for saccharides. Glycation reduces the solubility of lens proteins making them precipitate, which leads to the loss of transparency. The conjugated proteins are turned off from work of organism and result in formation of the pathologically changed tissues, «collagen cross-linking» together for example, and to formation of wrinkles. Probably the worst consequence of glycation is cross-linking, which is the formation of chemical bridges between proteins or other large molecules. A material that undergoes cross-linking usually becomes harder, less elastic and has a tendency to tear or crack. Cross-linking is responsible for hardening of a rubber mat or a garden hose left in the sun. In the aging body, cross-linking contributes to hardening of arteries, wrinkling of the skin and stiffening of joints. Such cross-linking are named Advanced Glycosilation End-Products (AGE) is damaged by sugar proteins. Glucose is not the only possible cause of cross-linking. Cigarette smoke, UV-radiation, heavy metals, peroxides, acetaldehyde (a product of alcohol metabolism) are all potent cross-linkers. Free radicals promote and accelerate many types of cross-linking and may also be cross-linkers themselves. Anti-AGE-therapy is directed on prophylaxis of aging of skin. However to this system take not only matters, avoidable environmental factors, minimize your sun exposure and/or use effective UVA+UVB sunscreen, neutralizing the damaging action of monosaccharides but also all of arsenal of BAS, contributing the prolongation of youth and preventing of wrinkles. The point of application of processes of glycation in a skin mainly are dermal structures: collagen, elastin, glycosaminoglycans. With the processes of free-radical oxidization link the aging of organism and development of heavy diseases of senility. A skin is a primary barrier on the way of free radicals, coming from an external environment. Free radicals are name the splinter of molecule, having free valency and that is why extraordinarily high chemical activity. Free radicals enter into a reaction as a result of which those or other free radicals appear again. In modern literature generally accepted is a term «oxidizing stress», which harm, inflicted an organism by the products of chemical reaction of free radicals of oxygen, is understood under. A skin is the greatest organ, subject to

permanent influence of free radicals, appearing as a result of the aerobic breathing and under influence of factors of environment (UV, ozone, ionizing radiation, oxides of nitrogen, organic pollutant, heavy metals, smoking, dusts, microorganisms, alcohol, stress, traumas, ischemia, inflammation, excessive employments by sport (physical stress)). According to the free-radical theory of aging of time and under influence of external and internal damaging factors there is exhaustion of antioxidants of epidermis, as a result the oxidized products of DNA, lipids, albumens accumulate in an organism, which influence on the genetic program of cells, and enzymes lose a normal function. It brings about inability of aging cell to adapt oneself to the changing terms of environment. There is the system of defence and regulation of free-radical oxidization, allowing to support intensity of these processes at optimum level is the antioxidative system. It is set that a horny layer of epidermis possess the exceptionally developed and effective system of antioxidative defence which in of ten times excels such other organs and tissues. Antioxidants can be exogenous (vitamins A, E, C) and endogenous (glutathione is compound of glutamic acid, cysteine, glycine; endogenous proteins: catalase, superoxide dismutase, glutathione-peroxidase, glutathione-reductase; lipidic antioxidants: ubiquinone (coenzyme Q)). The mechanism of action of antioxidant following. All of electrons in his molecule are coupled. At co-operating with him of free radical there is a transmission of electron on the molecule of antioxidant. Thus a free radical becomes a normal, stable, valency-saturated molecule. The structure of molecule-antioxidant is such, that a low-level radical which is not able to continue a chain reaction and perishes appears from it. Thus, the free-radical theory of aging of skin supposes the surplus producing of the reactively oxidized molecules at exhausting of potential of antioxidative defence.

**Another aging theories.** The theory of Cellular Clock by Hayflick consists in that every cage has the programmed life-span and potential of division, however there are variations depending on the type of cages. There is reverse dependence between age and potential of division of maternal cages. Hayflick found that human fibroblasts in culture would divide about fifty times and then stop. It was suggested that the Hayflick limit is a genetic program that prevents cell division after a certain number of cycles. Why would our cells need to have such a program? The current view is that a built-in limit on the number of possible cell divisions reduces the risk of uncontrolled cell growth resulting in cancer. Indeed, studies indicate that in cancer cells this genetic clock is broken, allowing them to grow indefinitely. Eventually, the molecular mechanism behind the Hayflick limit was discovered. In the cells of higher organisms, chromosomes are capped with special DNA structures called telomeres. The main role of telomeres is to protect the ends of chromosomes from degradation. During cell division the chromosomes are duplicated through

the process of DNA replication. However, due to the nature of this process, the very ends of the telomeres cannot be copied.

*The theory of telomers* consists in that there is a loss of a few pair at every replication of genes, constituents basis of telomers, providing the maintainance of primary genetic information. When telomeres become too short, a division becomes impossible. When fibroblasts approach fifty divisions not only they lose the ability to divide but also begin to look and behave "old": their metabolic activity decreases, they increase in size and accumulate lipofuscin, the pigment responsible for age spots. Deserves attention also theory of accumulation. In an organism different matters accumulate and put aside in tissues. In a skin under a basale layer a calcium is put aside, a collagen is put aside in the subendolelium layer of large arteries. However more correct to examine these phenomena as not reason, but as investigation of processes of senescence. From this theory the accumulation of «terminal toxin» of lipofuscin flows out also. Lipofuscin is a pigment, appearing in cages and being prooxidant. Lipofuscin surplus appears in an organism at overeating of the unsaturated fats, stresses, UV, surplus of aluminium, iron, surplus of estrogens.

At the formation lipofuscin needs oxygen, that creates hypoxia in tissues, diminishing of education ATP, and as a result – degradation of tissues, to the mutation in the genetic vehicle of cages. He inactivates proteolytic enzymes, hindering the update of cellular material. In addition, lipofuscin damages mitochondrions, resulting to presenilation. Germ cells (the cells that develop into sperm or ova) and cancer cells are obviously immortal. Embryonic stem cells (and perhaps some adult stem cells) may also be potentially very long-lived or immortal. However, whether a stock of immortal stem cells exists in a tissues (such as skin) or not, the accumulation dysfunctional cell that reached the Hayflick limit appears to be a problem. Most cells do not die when they hit the Hayflick limit. Instead they enlarge, lose theiruseful functions, slow down and just sit there lazily interfering with younger cells. It was found that the skin of older individuals has about three times as much senescent fibroblasts as a young skin. In fact, the loss of capacity due to the accumulation senescent may affect a wide range of tissues in the body.

*The theory of DNA Damage and Repair* calls with the theory of somatic mutations, in obedience to which senescence – there is investigation of accumulation in the genes of mutations, arising up under influence of damaging agents at the gradual loss of the systems of defence of genetic material. Their appearance results in appearance of the changed, not functionings albumens and to the loss of different functions of organism. DNA (deoxyribonucleic acid) is a pivotal molecule of life; it contains the blue print of the organism encoded in genes. DNA is the most indispensable part of the cell. Other structures, such as RNA, proteins and lipids, can be completely replaced according to the



instructions in the genes. DNA, on the other hand, cannot be replaced if lost or damaged beyond repair. Damage to the DNA can have two main outcomes: the cell dies or the cell mutates. The latter means that one or more genes lose or change their properties. The vast majority of mutations are either harmful or neutral (no effect). The substances that can damage DNA and cause mutations are called mutagens. Free radicals are the most common mutagens; other examples are N-nitroso compounds, aldehydes, asbestos and coal tar. Most mutagens are also carcinogens (cancer-causing substances). DNA is constantly bombarded with mutagens. Most mutagens, like oxygen free radicals or some aldehydes, are normal products of metabolism and cannot be avoided; others, like cigarette smoke or acetaldehyde (a product of alcohol breakdown in the body) are self-inflicted; yet others can come from environmental pollution. Different types of radiation also cause mutations; the damage produced by UV-radiation is limited mainly to the skin, cornea and retina, whereas high-energy radiation, such as X-rays, can cause mutations anywhere in the body. Cells have many enzymes involved in DNA repair; most of the damage gets repaired without any adverse consequences. However, a few lesions always slip by and turn into permanent mutations. The idea that the accumulation of mutations may be an important mechanism of aging is not new. It was convincingly demonstrated in many studies that the maximal life span (the longest a species can live) correlates with the efficiency of DNA repair, and, therefore, with the frequency of mutations. In particular, humans have the best repair system and the longest life span among mammals. It was found that the frequency of mutations rises with age. One probable reason is that over time the repair system itself becomes affected by mutations, so less damage is correctly repaired. Also, as we age, our bodies generate more free radicals, and, therefore, there are more mutations and other DNA lesions in the first place. In fact, free radical theory and DNA damage theory of aging are closely related because DNA is one of the primary victims of free radicals. All of these theories of senescence interlace between themselves, as processes of senescence are associated. On pathology and clinic of senescence of skin select two basic types of senescence of skin: chronoaging (and subtype the hormonal aging) and photoaging.

Clinic of senescence of skin Chronoaging is related mainly to the genetic, hormonal and catabolic factors. Thus there is a pallor from abnormalities of microcirculation and reduction of melanogenesis, appearance of wrinkles on a background of flat texture (diminishing of amount of fibrous structures and glycosaminoglycan of dermis, thinning of epidermis), dryness from atrophy of appendages of skin and decline of level of estrogenic saturation of skin, development of tumours from the decline of immune protective forces of organism (diminishing of number of Langerhans cells). A skin constantly is

under influence of estrogens, which activate epidermal keratinocytes and melanocytes, stimulate the synthesis of collagen and elastin, prevent degeneration of collagen, improve moistening of skin and microcirculation. At the menopause, when the amount of estrogens goes down, atrophy, atony and dehydration grow quickly, the thickness of horny layer is increased, that conduces to worsening of color of skin, due to hyperkeratinization, formation of wrinkles. Also a hormonal disbalance can be accompanied with hyperandrogenism, that results in development of late acne and seborrhea, androgenetic alopecia, hirsutism, to abdominal obesity, intensifying of cellulit.

A photoaging arises up under influence of natural and artificial insolation. Thus there is a rather yellow tint and dryness from the phenomena of hyperkeratinization and thickening of skin (a presence of chronic inflammatory infiltration in derm), in homogeneous nodose surface of skin and appearance of premature wrinkles on a background subclinical inflammation, elastosis and making progress loss of collagen, telangiectasias due to vasodilatation because of chronic inflammation, un even pigmentation (protracted influence of ultraviolet on melanocytes).

The degree of sun damage has been classified by Glogau:

a. Mild (age 28-35 years): Few wrinkles, no keratoses, requires little or no make-up

b. Moderate (age 35-50 years): Early wrinkling, sallow complexion with early actinic keratoses, requires little make-up

c. Advanced (age 50-60 years): Persistent wrinkling, discoloration of the skin with telangiectases and actinic keratoses, always wears make-up

d. Severe (age 65–70 years): Severe wrinkling, photoaging, gravitational and dynamic forces affecting skin, actinic keratoses with or without skin cancer, wears makeup with poor coverage.

According to Rubin, there are three levels of photoaging:

Level I: wrinkles visible only when a muscle contracts, rough, opaque, and mottled skin. Chronoaging and photoaging: fundamental differences. Criterion Chronoaging Photoaging

Level II: mimic wrinkles and some fine lines visible at rest, dyschromias and senile keratosis telangiectasias.

Level III: deep wrinkles always visible throughout the face thick, yellowish, and creased skin, senile keratoses and actinic keratosis. In a cosmeticology aspect one of basic signs of senescence are wrinkles. They are determined as unidirectional furrows skin surface and arise up because of formation of fold in an epidermis and derma. The following processes take part in forming of wrinkles: a basale membrane becomes flatten, horny layer – incrassate (photoaging), the amount of collagen and elastin diminishes, there is

their hardening (glycation), moisture is reduced, there is thinning of hypodermis, dermis and epidermis.

### **3 types of wrinkles:**

- Mimic wrinkles arise up as a result of the repeated reductions of skin muscles (Crow's feet around the eyes are due to smiling and activity Anatomic Thinning of epidermis and derma, diminishing of number of melanocytes, decrease of Langergan`s cells, fibroblasts, decline of collagen). Thickening of horny layer, thinning, and then thickning of epidermis, appearance of atypical ceratinocytes, increasing of pigmentation, increase, and then decline of collagen. Histological degenerations of elastin, diminishing of number of the blood vessels, atrophy of sweat-glands accumulation of a morphous elastin, vasodilatation, presence of inflammatory infiltrate in derma. Physiological decline of elasticity andresiliency, weakening of inflammatory answer, slow wound healing activity. Decline of elasticity and resiliency, local immunity imbalance clinical wrinkles, flabby skin, atrophy of skin, decrease of elasticity dry, wrinkled skins, pigmental spots, flabbiness, desquamation, telangioectasias, cancer of skin. Of the eyelid muscles (orbicularis oculi), Worry lines on the forehead are due to contraction of the frontalis muscle when raising the eyebrows, frown lines between the eyebrows are due to contraction of corrugator supercillii muscles and procerus muscle when concentrating or angry)

- The gravity-type of wrinkles arise up because of stretch, hanging down, atrophy of skin.

- Wrinkles of atrophy skin: plural, thin, having the appearance of heterogonous relief folds. Areas, opened for insolation age more quick, than closed. On face selecttwo areas, especially sensible to the senescence: area near eyes and round lips. Select 3 types of senescence of skin of face and neck. The wrinkled type is often observed for asthenics and normosthenic of nervous type, can combine with dyschromia and keratosis. A skin looks grey, with deep wrinkles on all of face. The senescence of such type is observed for people with a dry, water-free skin, smokers, actors (make-up), sun lovers. The signs of senescence come to 40 years. A deformation type is accompanied disturbances of face oval, hanging down of cheeks, double chin, folding of neck. Wrinkles can be not, except for mimic. As a rule, is for people with a thick, fat skin, hypersthenic persons, rosacea and cuperose is accompanied. The mixed type shows up the presence of signs of senescence, characteristic for the first two types.

The Fitzpatrick classification of facial lines refers to the degree of wrinkling around the mouth and eyes:

Class I: Fine wrinkles

Class II: Fine-to-moderately deep wrinkles and moderate number of lines

Class III: Fine-to-deep wrinkles, numerous lines, and possibly redundant folds.

Fine lines and wrinkles arise because of irregular thickening of the dermis and because of a decrease in the amount of water held by the epidermis. This is mainly caused by sun damage and exposure to environmental toxins such as tobacco smoke.

Furrows – deeper lines or furrows are classified as *dynamic* or *static*. Dynamic lines appear with movement i.e. the activity of facial muscles. Static lines are unchanged with muscle movement. Eventually dynamic lines become static.

Correction of age-dependent changes A senescence of skin is one of aspects of senescence of organism on the whole, therefore going near the correction of this state must be complex and to include internal and outward treatment.

Developing the program of correction of age-dependent changes of skin, it is necessary to aim to attain a maximal effect at the rejuvenation of person, follow to the criterions of healthy skin, offered Z.E. Obagi 2000:

- smoothness
- resiliency
- homogenous colouring
- absence of clinical signs of dermatoses and injuries
- normal texture (without wrinkles, scars, defects)
- normal moistening
- high stability to the infection and damaging factors

## **PATHOLOGICAL SKIN TYPES IN THE PRACTICE OF A COSMETOLOGIST**

**Sensitive skin.** A sensitive skin has low tolerance to the external irritants in combination with high reactivity. Its sensitiveness depends on many factors: genetic, ethnic, ecological. Hyperreactivity of skin can be inherited, to accompany other diseases, caused the use of low quality cosmetics, frequent application of cleansers. Clinically sensitive named a skin, which itches, scale off from a cold, wind, water, sun, different chemical matters, including cosmetics.

**Pathogenesis.** The sensitiveness of skin is determined the state of epidermal barrier, that in same queue is related to intensity of allergic reactions, free-radical oxidization and by work of the immune system. To violation of epidermal barrier can bring the followings factors over:

- lack of a build material for ceramides (essential fatty acids – linolic, linolenic,  $\gamma$ -linolenic), as a result of violation of nutrition, malabsorption or dysbacteriosis (transformation of the unsaturated fat acids in saturated), pathology of metabolism, endocrine disorders;
- affecting skin SAS (laurylsulfate sodium), that results in disorganization of lipids and violation of their synthesis by epidermocytes;
- influence of solvents (acetone, chloroform), that causes temporal destructions of lipid layer;

- activating of lipid peroxidation (UV, smoking);
- mechanical damage of skin (scratches, cuts, wounds, peels and other).

Partly hyperreactivity of skin has allergic nature. Thus odorant, colouring agent, animal proteins, vitamins, antibiotics, extractions of sea products, products of beekeeping, components of essential oils and other are forward allergens. These matters straight cause the damage of tissues and operate at once. Sometimes allergic reactions are caused haptens – contacting low-molecular matters (nickel, formaldehyde) which become allergens with the proteins of skin. The protect systems of skin test an overload: violation of epidermal barrier results in the overload of the immune system toxins, microorganisms, cytotoxic matters and allergens. Arising up in a skin reactions are accompanied the emissions of free radicals.

That an allergic reaction was memorizing of allergen must happen the cages of the immune system, therefore the first hits its in an organism does not cause undesirable reactions. But in future there is an enough insignificant amount of allergen, to cause return immune inflammation. Thus, an immunoreaction arises up in reply to penetration in the skin of matter and is specific, if it is an allergen and heterospecific, if it is cytotoxine. Clinically it is expressed in inflammation of skin or dermatitis artificial or allergic. At violation of integrity of epidermal barrier toxins easily get to the skin, causing destruction of cellular membranes, that results in surplus of prostaglandins and leukotrienes in a skin and development of inflammatory reaction. In development of immunoreaction, caused the direct damage of skin an important role is played by prostaglandins and leukotrienes. The predecessor of these matters is arachidonic acid, entering in the complement of phosphotides of cellular membranes and some other polisaturated fat acids. The system of prostaglandin cascade provides an instantaneous reaction on a damage. At destruction of cellular membrane from the freed fat acids are syntetized prostaglandins and leukotrienes by macrophages and other cells of the immune system. In a two-bit prostaglandins possess a anti-inflammatory action. Their surplus causes an inflammatory reaction. Leukotrienes, formings of arachidonic acid play an important role in development of allergic reactions.

Some matters damage not only an epidermal barrier but also eppidermytes. SAS (their aggressiveness is related also to the cumulative effect) are slowed reparation of epidermal barrier at the damage of epidermytes and result in violation of synthesis of lipids. All of them causes the further increase of permeability of skin, penetration of water, microorganisms, toxins. Water allows microorganisms to propagate oneself, because of what activating, and then restart of the immune system develops at first.

Formation of free radicals accompanies all of immunoreactions, because immunocytes actively utilize toxic properties of oxygen in a fight against microorganisms. It is known that than more connections are in the molecule of fat acid, is oxidized easier. A sebum fat acids of which mainly saturatedis

poorly subject to oxidization. Epidermal lipids which a lot of the unsaturated fat acids is in composition oxidized easily. Peroxidation of epidermal lipids results in destruction of epidermal barrier and education in the epidermis of plenty of free radicals.

Classification of sensitive skin.

1. Skin, predisposed to the reactions of enhanceable sensitiveness from endogenous reasons: seborrheic dermatitis, acne rosacea, mixed rosacea, deficit of the unsaturated fat acids, enzymopathy, age-dependent, sexual, racial, genetic factors and other.

2. Skin with reduced tolerance: irritated, damaged.

3. Sensitive skin with the signs of enhanceable reactivity: skin with the signs of allergy with the signs of atopy.

**Skin, predisposed to the reactions of enhanceable sensitiveness.** As a result of defeat of skin seborrheic dermatitis and rosacea its sensitiveness, being the obligatory symptom of these diseases. In lipids of surface of skin at seborrheic dermatitis the general amount of squalene is reduced, on a background the increase of level of triglycerides, cholesterol and its ethers. Mixed rosacea name the also «mixed dermatitis of face», characterized combination of rosacea with seborrheic dermatitis.

An enhanceable sensitiveness of skin is one of displays some inherited enzymopathy. At a phenylketonuria (violation of exchange of phenylalanine) and homocystinuria (violation of exchange of methionine) hypochromia is marked, eczema-like and dystrophic obligatory changes, dryness of skin, decorticating, enhanceable sensitiveness to insolation. The lack of the unsaturated fat acids arises up at violation of their suction because of lack of lipases or their inhibition (reception of orlystat and other), lack of the unsaturated fat acids in food (nonfat diet, reception of absorbers of fat), at dysbacteriosis (oxidization of the unsaturated fat acids and mastering them in the saturated kind). Thus there can be dryness, decorticating, hyperemia and irritate of skin. An irritate skin is characterized permanent internal readiness to the irritation («subjective dermatitis»). Its reactivity passes ahead and excels aggression of exogenous factors on intensity. Subjective complaints are richer, than clinical picture. It feeling of heat, sens of contraction skins, pricking, clinical displays can absent here. Easily can pass to the state of irritant skin. This is an inflammatory reaction without an immune component. It can become reason of senilism of skin or forming of its pathosis (contact allergy). An irritate skin can be conditioned both endogenous (age, half, type of skin, race, heredity, hormonal status, properties of psyche) and exogenous factors (climate, hygiene of skin, feed, cosmetics). Usually the correction of this state consists in the correct individual cosmetic care.

**Skin with reduced tolerance.** An irritated skin is a sensitive skin, reactive on the factors of environment. Arises up as a result of action of mechanical

(epilation, shaving), chemical (detergent, cosmetic facilities) factors, as a result of treatment of acne (irritating, drying facilities, keratolytics). Clinically characterized sense of contraction, pricking, redness, decorticating, roughness. Pathology expansion of capillaries of superficial layers of derma and inflammatory reaction is underlaid on exogenous factors.

The damaged skin is a skin after application of cosmetology methods on smoothing out of wrinkles, peels, laser vaporized, radiowave vaporized which are accompanied the damage of its superficial layer. Clinically characterized sense of contraction, pricking, sometimes by pain, hyperemia and edema.

**Sensible skin with enhanceable reactivity.** Skin with the signs of allergy. Allergic reaction on application of different cosmetic facilities and local medicinal preparations observed more frequent after the repeated contact with an allergen, through some period of time. Clinically shows up as a sharp eczema or allergic dermatitis: hyperemia, itch, vesicle, weeping. Treatment consists in the exception of contact with an allergen, drafting of allergist questionnaire in the case of obscure allergen. Information of anamnesis, allergic skin tests are utilized. The leadthrough of allergic tests or applique of new cosmetic facilities is obligatory.

*Skin with atopy.* The concept of atopy behaves to constitutional status of polygenic etiology, which different clinical displays are characteristic for (neurodermatitis, atopic dermatitis, constitutional eczema, rhine allergosis, bronchial asthma). Clinic: itch, sometimes painful, excessive dryness of skin, lichenification, the periodic intensifying is diseases, which are expressed in an unendurable itch, hyperemia, edema, appearance of papula-vesicle, weeping, formation of scales, crusts, decorticating and excoriation. The secondary infection joins frequently: bacterial, rarely – viral. Atopy the hypersensitiveness of slow type is underlaid in reply to a contact with exogenous allergens: food, by animals, infectious, domestic, vegetable and other. For a disease is also characterized violation of epidermal barrier, related to the deficit of essential fatty acids, squalene as a result the level of ceramides goes down in lipids of horny layer. It shows up the increase of transepidermal loss of water and dryness of skin. In the places of defect of intracellular membranes of horny layer the barrier function of skin goes down sharply, that facilitates penetration in the skin of different irritants, toxins and pathogens. In addition, such patients have a disbalance of the immune system, what and the enhanceable sensitiveness of organism is explained to some allergens.

#### **Correction of sensitive skin.**

1. **Consultation** of dermatologist, allergist.
2. **Individual cosmetic care.** Recommend irrigation termal water. Clearing emulsions, clearing water, gel for washing are preferable. For moistening, nuirishing and protection are emulsions «oil in water» and «water

in oil». The sensitive skin care provides for soft cleansing, reconstructing of skin barrier properties, hydrating and protecting. Ideally sensitive skin cosmetics do not contain an allergens, cytotoxic substances, aromatizers, stains, preservatives and should be sterile. Modern cosmetics for sensitive skin contain a minimal number of ingredients. The essential oils, alkalis, surface-active materials, high concentration of preservatives, alcohols, acetone, aggressive BASEs, photosensitizer (extracts of St.-John's wort, limon oil, bergamot oil) have to be miss. Some substances, such as citral, cinnamyl aldehyde, benzyl salicylate, phenylacetaldehyde, Peru balsam, limon oil, jasmine oil, bergamot oil, lavender oil, methyl heptin carbonate, cananga oil, ylang-ylang oil, neroli bigarade oil, cedarwood oil, almond-oil, sesame oil, peanut oil, beeswax, hexachlorophene, triethanolamine, surface acoustic waves, retinol, alcohols, propylene glycol and other are included to the potentially irritative substances list. The cosmetics for sensitive skin includes film-forming, antibacterial matters and antioxidants. The natural polysaccharides, such as chitosan and hyaluronic acid are usually used like a film-forming substances. Along with them artificial polymers based on acrylate derivatives are used recently. The saturated grease (silicones, vaseline, coconut oil, palm-oil), glycerin, hyaluronic acid, albuminous hydrolyzates, amino acids, plant polysaccharides, lactic acid, urea, sodium pyroglutamate, milk proteins are put to formulation. Some plants are used for sensitive skin as an **antiseptics**, these are anise, basil, white willow, witch-hazel, gardenia, pear-tree, elecampane, clover, lavender, burdock, licorice, fennel, black poplar. Along with antiseptic compounds they contain polysaccharides and bioflavonoids, which protect skin cells from cytotoxic substances. The extracts of cowberries, grapefruit, green tea, kiwi, orange, papaya, passion-flower, peach, ananas, pine needle, aloes, cinchona, lime-blossom, algae, juniper. As a **antioxidant** addition in this cosmetics traditionally use vitamins E, C, carnitine, polyphenol compounds. The red grapes, pine-tree, rosemary, green tea, soy, lucerne, foxtail clover, maidenhair tree, palmetto are riched on polyphenols. The immunomodulators insert to cosmetics for sensitive skin. The cod-liver oil, linseed-oil, colza oil, blackberry oil riched on  $\omega$ -3 fatty acids, which have an anti-inflammatory effect properly anti-inflammatory prostaglandin production increase. The azulene,  $\beta$ -glucan, extracts of witch-hazel, black poplar, elecampane, green tea, lavender, cola, bilberries, willow, red grapes, turmeric, aloe, ginkgo, grape's pits have an anti-inflammatory effect influence. The hyaluronic acid has an anti-inflammatory effect, reduces of edema, influence as a immunomodulator. As a **restructuring epidermal barrier** component for sensitive skin are recommended black currant oil, common borago oil, primrose oil, riched  $\gamma$ -linoleic acid. The allantoin, extracts of licorice, lavender, burdock, lucerne, ivy, mango, calendula, papaya, passion-flower, rest-harrow, St.-John's wort, algae, pear,



witch-hazel have a **regenerating** effect. The hyaluronic acid have a expressed **regenerating** effect. It makes viscous layer with acidic properties on the wound surface, has a biostimulating effect, decreases the risk of cicatrice beginnings. The composition trio of lipids influenses on the reconstruction lipidic layers speed: ceramide- essential fatty acids- cholesterol. The effective in proportions 1:1:1, optimal – 3:1:1 (quick reconstruction of lipidic barrier and restraint the moisturein skin). The optimum relationship for normal skin functioning  $\omega$ -6:  $\omega$ -3 equal to 1:1 – 4:1.

The source of essential fatty acids:

- linoleic acid: apricot kernel oil, peachy oil, avocado oil, borago oil, grape clingstone oil, walnut oil, hempseed oil, corn oil, sesame oil, almond-oil, wheat corcules oil, sunflower-seed oil, holy thistle oil, rice bran oil, safflower oil, soybean oil, passion-flower oil, pumpkin seed oil, black currant oil, hips oil, evening primrose oil;

- linolenic acid: walnut oil, hempseed oil, rice bran oil, soybean oil, black currant oil, hips oil;

- $\gamma$ -linolenic acid: borago oil, black currant oil, evening primrose oil, chlorella. The plants extracts of none-so-pretty, honeysuckle, burdock, buttercup, mallow.

3. **Manual methods.** Causing of alginate mask, massage on oil, to enriched by restructuring an epidermal barrier components, cosmetic programs for a sensitive skin. As a soft deep cleaning enzymatic peels or gommage are allowed.

4. **Vehicle methods.** Ultrasonicphoresis of gel of hyaluronic acid, aloe, ultrasonic peel.

5. **Injection methods:** mesotherapy.

**Dry skin.** A skin is named dry, if a patient grumbles about the unpleasant feelings – gathering, pricking, itch, burning, pain; if a skin is rough, rough, dim, lifeless, with the areas of redness, decorticatings, by superficial and deep cracks.

**Pathogenesis.** In pathogeny of forming of dry skin an important role is played by violation of epidermal barrier and tripping of corneocytes, change moisture of skin. An important role in forming pathologically of dry skin is played by fat acids. The unsaturated fat acids are basic part of cellular membranes, participate in the process of formation of bioactive matters (steroid hormones, prostaglandins and other). Linolic acid gets in an organism with food and processed in  $\gamma$ -linolenic, which provides with a skin oxygen, regulates proliferation of cells. In addition, linolic acid is responsible for formation of lecithin which protects a skin from harmful influence of water and does its resilient. Therefore dryness of skin on a background violation of its lipids exchange, as a rule, is accompanied the signs of its enhanceable sensitiveness.

The amount of bound-water in a horny layer in a great deal depends on the size of natural moistening factor (Natural moisturizing factor - NMF). The hygroscopic molecules of NMF are able to attract moisture from air and retain

it. From the loss of moisture an organism is protected by a fatty layer – hypodermis. Derma, which, as a sponge, absorbs moisture, begins after it, as has an own source of water-supply – network of blood vessels. This water contacts with the molecules of intercellular matter of derma, gelling. Therefore, increasing water content of derma is possible, increasing maintenance in it glycosaminoglycans and collagen. Surpluses of water from derma rise slowly, leaking in an epidermis.

A dry skin is the pathognomonic sign of atopic dermatitis, neurodermatitis, dry eczema, ichthyosis, xeroderma, psoriasis, seborhoic dermatitis, some congenital keratoderma. Pathological dryness of skin with the phenomena of hyperkeratinization can be one of displays of climax. Dryness of skin can develop at an inefficient cosmetic care, as a result of influence of external and internal factors, at the deficit of essential fatty acids. In these cases dryness of skin is accompanied a sensitisation. In addition, for such skin characteristically more early chronoaging and photoaging. For many diseases, along with dryness and enhanceable sensitiveness of skin, the phenomenon of hyperkeratinization – surplus excrescence of horny layer, which is accompanied formation of scales and decorticating, is characteristic.

Factors which contribute to dry and cracked skin include:

- Inherited factors
- Metabolic factors such as an underactive thyroid gland, or excessive weight loss
- Increasing age, resulting in decreased natural lubrication
- Cool weather, especially when windy or the humidity is low
- Air conditioning, central heating or sitting close to a fire or fan heater
- Excessive bathing, showering or swimming, especially in strongly chlorinated hot or cold water
- Contact with soap, detergents and solvents
- Frictional irritation and chapping

**Classification:**

1. Seborrhic type (oil-glands are too active, epidermal lipids and water-holding substances are not enough, sweat-glands work normally). Other name is a oil water-free skin. Acne, seborrhea.

2. Sebostatic type (activity of oil-glands is lowered, epidermal lipids and water-holding substances is not enough. The function of sweat-glands can be low). Other name – actually dry skin. Senile dryness of skin, climacteric dryness of skin.

3. Normal type (oil-glands work normally, epidermal lipids and water-holding substances is not enough, the function of sweat-glands is normal or a few low). Other name is a normal skin with a tendency to dry.

4. A dry skin as display of dermatological pathology (psoriasis, keratoderma, dyskeratosis, dry eczema, ichthiosis, atopic dermatitis and other) is the pathological type of dry skin.

**Clinic.** The basic clinical displays of dry skin are decorticating and dermahemia. Seborrheic type of dry skin. A oil skin can be deprived fats, namely by essential fatty acids. Their deficit can result in violation of barrier function of skin, strengthening of inflammation, appearance of decorticating and itch. Possibly, exactly lack of essential fatty acids in the epithelium of follicle of oil-gland on a background the surplus products of endogenous fat acids, is principal reason of development of hyperkeratinization of channels of oil-gland. Psoriasis is scaly lichen. Disease hyperproliferation of epidermis is underlaid. Along with it at patients psoriasis is mark disorganization and immune inflammation of connecting tissue, disbalance of the immune system, signs of metabolic, defeat of liver, gastroenteric highway disturbance. Psoriasis is begun sharply with appearance of shallow rose-red papulae, covered silvery-white easily slabby scales. Papulae, increased in sizes, grow into the name-plates of different size, which quite often meet between itself, forming the vast infiltrated focuses of polycyclic outlines (diffuse psoriasis).

*Dry eczema.* Often elderly people, especially men, suffer a dry eczema after 65 years. Usually beginning of disease or intensifying the winter. Localization is shins, forearm, hands, trunk. Clinic: a skin is dry, chappy, decorticating, hyperemia. A procatarxis is the frequent washing hot water with soap, too warm and dry air in an apartment.

*Neurodermatitis.* A diffuse neurodermatitis is characterized dryness of skin, itch, scratches. In the sharp stage are hearths of hyperemia, papulae, plaques, decorticating. Erosions are possible, weeping, crusts. In the chronic stage – lichenification, shallow papulae, cracks. The limited neurodermatitis shows up one or a few itching hearths of lichenification. Favourite localization is a back surface of neck, hairy part of head, ankles, shins, outward surface of forehands, perigenital and perianal area.

*Ichthiosis and xerodermia.* Ichthiosis is a group of the inherited diseases of skin which is characterized violation of cornification. A hyperkeratinization results in appearance of scales, reminding a fish scale. A cornification can be shown in a different degree: from a barely noticeable roughness (xerodermia) to the heaviest changes of epidermis, at times incompatible with life. Ichthiosis is intensified in winter under influence of cold dry air, in summer is an improvement. Clinic: dryness of skin, decorticating, sometimes follicle hyperkeratinization, underline skin picture on hands and soles. The tylosis of hands and soles can develop sometimes. The staggered areas can have a dirty kind from the umber painting.

*Keratodermias* is a group of dermatoses with violation of cornification mainly in area of hands and foot. An innate palm-footkeratodermias can show up from birth, sometimes in youth and grown man age. Characterized horny stratifications of area of hands and foot, sometimes with the erythema, delimited from a healthy skin. There can be defeats of interphalangeal joints, contracture, change of nail plates. Sometimes the crateriform deepenings stays after the delete of horny the masses, rarer similar changes are observed on other parts of body. Treatment is symptomatic (ointments with keratolytics, by indifferent, regenerating substances, corticosteroids).

Keratosis follicularis Darier's is a autosomal-dominant disease. Usually observed in the period of pubescence. Clinically shows up plural miliary and lenticular by the horny papulae of brown color, covered scales as spinule. At their delete a dry skin is revealed. Can be observed weeping, vegetations, warty excrescences.

### **Correction of dry skin:**

**1. Consultation** of dermatologist.

**2. Mode.** People with a dry and sensible skin must avoid preservative and aromatizers, as they especially easily penetrate through the broken protective layer of skin. It follows them to avoid clothes from wool, which can cause an itch, clothes from waterproofmaterials (salts of drying out sweat can irritate a skin), it is necessary carefully to apply fabrics with impregnations and facilities of care of clothes.

**Individual cosmetic care.** Cosmetic facilities for the correction of dry skin are mainly presented in form emulsions, masks, facilities for baths (emulsions, oils). For clearing utilize emulsions (oil in water), cream for washing, rarer is gel for washing, dermatological soap. As a daily and nightly mean are emulsions (oil in water and water in oil), cosmetic oil. For an intensive care – mask. The cosmetics for dry skin contain biologically active substances which restrict of epidermal barrier, peel of skin. Moreover the rehydratants, regenerates, antioxidants, anti-inflammatory and antiseptic ingredients are required for dry skin too.

**The epidermal barrier restructuring substances.** The natural oils reached of unsaturated fatty acid are included in cosmetics for dry skin for epidermal barrier reconstruction. They are borago's oil, evening primrose oil, blackberry seed's oil. The sterol riched oils, such as hips oil, soybean oil, safflower oil, stimulate of keratinocytes and have an anti-inflammatory influence. The oils rich in saturated and monounsaturated fatty acids promote to restructuring for epidermal barrier because of occlusal behaviours. They are, shea oil, corn oil, coconut oil, cocoa oil and oth. The lipidic mixtures which superposed of physiological lipids, such as ceramids, cholesterol, free fatty acids, lecithin, are effected too. The lamellar emulsion based on phosphatidylcholine are used for epidermal

barrier reconstruction recently. The smallest lipid's drops of these emulsions are stabilized by bilayer's network, which look like lipidic barrier bilayers.

**Regenerating component** of dry skin cosmetics are presented on plant extracts of calendula, burdock, lucerne, ivy, mango, papaya, passion-flower, rest-harrow, algae, St.-John's wort, herniary.

**Keratolytic component.** The urea excites an disintegration of corneocytes, depresses their proliferation, has an antibacterial and antipruritic effect. The lactic acid and propylene glycol are used as peeling substances. The lactic acid, retinoids, AHA, BHA and their salts depress dryness of skin, favour cast-off epithelium, possess of hygroscopic property, increase of plasticity and elasticity of skin. The retinoids thin corneal layer and favour to accumulation of glycosaminoglycans in the derma.

**Rehydratants.** The hydrophile film-forming substances, which made the water-retaining layer on the skin surface are hyaluronic acid, low concentration of AHA ad 2 %, glycosamine, collagen, elastin, DNA, RNA, liquid silicone, pectins. The hydrophile film-forming substances, which absorb moisture from the air are glycerin, sorbitol, propylene glycol, ethylene glycol. The hydrophobic, film-forming substances, which made the water-retaining layer on the skin surface are vaseline, paraffin, wax (bees, coniferous, arundinaceous), mineral oils, fatty alcohols, ceresin, lanolin, animal fats (goose-grease, spermaceti, porcine grease), squalen. The hydrophobic film-forming substances, which restrict hydrophobic film are steroid alcohol and their ethers, plants oils of avocado, jojoba, olive, castor, soy, phospholipids, lecithin, ceramides, fatty acids, lanolin. The hydrophobic and hydrophile rehydratants are included in formulation of cosmetics for dry skin usually. Some extracts, such as aloe, bamboo, cotton-plant, melon, kiwi, native lime, passion-flower, milk, paddy, ilang-ilang, raspberry-cane leaves have a hydrating property. The pomegranate's extract restores of natural circulation of water in skin stimulating it's aquaporines.

**The anti-inflammatory component** of cosmetics for dry skin are presented plant extracts of aloes, apple, arnica, avocado, black-currant, camomile, cowberries, grapefruit, guarana, hibiscus, kiwi, native lime, lime-blossom, althaea, wormwood, orange-tree, pawpaw, passion-flower, peach, pineapple, primrose, sage, mistletoe, milfoil.

**The essential oils**, which recommended for dry skin are spice bush, attar of roses, vetiver oil, jasmine oil, ylang-ylang oil, cinnamon oil, neroli oil, patchouli oil, camomile oil, sandalwood oil.

**3. Manual methods.** Complex programs for a dry skin (nourishing and moistening masks, massage on oil), chemical peels (12 % AHA), cryomassage, paraffin therapy.

**4. Apparatus methods.** Vaporization, vacuum-spray, electrophoresis, d'arsonvalization, microcurrent therapy, infra-red irradiation, chromotherapy (red color).

**Erythrocouperosis.** Erythrocouperosis is violation of circulation of blood in a skin cover because of expansion of vessels and loss of their elasticity. Shows up a hyperaemia and appearance of telangiectasias. More frequent than all observed in area of face, especially nose and cheeks. Telangiectasia (a.k.a. spider veins and broken capillaries) is abnormally dilated small vessels near the surface of the skin. They are usually only between 0.5 and 3 millimeters in size. They can develop anywhere on the body but are typically found on the face and/or legs.

**Pathogenesis.** The vascular plexus of skin is located on the border of papillary and reticulated layers of derma and on the border of derma and hypodermis. Appearance of teleangiectasias takes a place at sharp expansion of capillaries and increase of their amount in the epiphases of derma. The factors of development de bene esse divide by endo- and exogenous. The increase of level of estrogens (pregnancy, reception of contraceptives, defects of liver and violation of metabolism of estrogens), stagnant phenomena in the vessels of back surface of neck, vegetative neurosis, insular diabetes, pathology of liver, buds, cardiovascular system, breathing organs, system diseases of connecting fabric behave to endogenous. To the exogenous factors are taken avitaminosis (vitamins of C, K, P), professional intoxications and hazards (cooks, sea-folk, pastry cooks), influence of external factors of environment (UV, frost, snow, wind, overfalls of temperature), abuse of sauna, by a bath-house, harmful habits (alcohol, smoking, reception sharp and more steaming hot than food). To the professional factors, to cooperant the origin of the extended vessels, a contact belongs with a lime, solvents, aggressive eliminants. Contamination of environment harmful industrial connections and them a subsequent contact with a skin also can strike the system of blood perfusion of skin tissues. To such matters behave: dioxide sulfur, selected in an atmosphere at combustion of oil-fuel, fuel-oil and coal; suspension of fine-dispersed particles, appearing at incineration of petrol in the engines of cars; oxides of nitrogen, gettings in air in composition the exhaust-gass of motor-car engines. Tells on the state of the vascular system of skin and infatuation for aggressive cosmetic methods.

To one of the most frequent reasons of appearance of teleangiectasias in area of thighs there is cellulite and venous insufficiency. Symptomatic telangiectasias – displays of some dermatoses is possible: rosacea, seborrhea, lupus erythematoses, acrodermatitis. Congenital teleangiectasias arise up from the increased development of vessels (spots, nevus, angiomas). Racial distinctions also play an important role in development of erythrocouperosis: people with a delicate white skin more feel like the display of teleangiectasias as compared to the possessors of strongly pigmentous skin. One of factors of predisposition to erythrocouperosis is a sensitive skin.

Enlarged veins in the legs, both spider veins and varicose veins, are generally a result of venous insufficiency, a condition where blood pools in the veins due to excessive pressure and impaired drainage. In turn, venous insufficiency is caused by the damage to the vein valves that normally prevent the backflow of blood. The valves can typically get damaged for two reasons: excessive pressure and weakness of vessel walls. Thus, whatever increases pressure and impairs blood drainage from leg veins tends to contribute to the development of spider and/or varicose veins.

Facial spider veins are slightly different. They tend to be smaller and are generally not caused by excess pressure or vein valve damage. They are typically caused by the damage resulting from sun exposure or inflammatory conditions (such as acne rosacea). A combination of direct damage to vessel walls and excessive and prolonged dilation (e.g. due to chronic inflammation or irritation) often leads to facial spider veins/broken capillaries.

A number of factors are associated with the development of spider veins:

- Increasing age
- Family history of vein problems (spider or varicose veins)
- Hormonal changes, such as those during pregnancy or menopause.

Sometimes hormonal contraceptives may cause or worsen spider veins. (This factor is more relevant for spider veins on the legs.)

- Pregnancy. In addition to hormonal changes, pregnancy causes increase in blood pressure and volume, which can lead to spider veins on the legs.

- Various factors increasing blood volume and pressure in the legs (obesity, leg injury, prolonged standing, heavy lifting, etc.).

- Sun exposure, inflammatory skin diseases, such as rosacea, chronic skin irritation/inflammation. (This factor is more relevant for spider veins on the face).

**Clinic.** On the skin of couperosis more frequent than all shows up as teleangioectasias which appear from superficial capillaries and can be different color: red, dark blue, darkly-violet. Red and thin, not salient above the surface of skin, develop from capillaries and arteriols. Dark blue, more wide, formed from venules. On a form the teleangioectasias are divided by a few types. Red linear teleangioectasias is more frequent disposed on cheeks and nose and couperose is named. Dark blue and red linear and tree-like teleangioectasias develop on lower extremities. Spidery red, consist of feed-in arteriols from which the plural extended capillaries go away radially.

Stages of development of couperosis:

1 stage is single telangioectasias on cheeks and wings of nose;

2 stage – a vascular picture (blush) occupies 1/3 persons;

3 stage – poured out couperosis, occupying practically all of surface of skin of face.

### **Cosmetic correction of erythrocouperosis.**

1. **Consultation** of dermatologist and contiguous specialists with the purpose of correct diagnostics, treatment of basic disease in the case of symptomatic erythrocouperosis or cosmetic delete of defect.

2. **Diet**, eliminating an alcohol, sharp and hot dishes, marinades. Also does not recommend to use a liver, yoghurts, sour cream, raw, chocolate, vanilla, soy and soy-bean products, zymic products, citrous, bananas, raisin, red plums, figs, avocado, spinach. Inward recommend the vitamin of C (participates in the synthesis of collagen, strengthens capillaries, narrows vessels), P (reduces a fragility of capillaries), vitamin K (needed for a normal hemopexis at haemorrhage), E (reduces the coagulability of blood), preparations are omega-3 of fatty acids (strengthening of wall of vessels and antiatherosclerotic action). To eliminate the visits of bath-house, saunas, avoid influence of hot steam.

3. **Individual cosmetic care.**The sensitive skin cosmetics are used for erythrocouperosis correction. It includes vascular components and substances, which is conducive of skin thickness extension (elastostimulators, rehydrans). The extracts of ginkgo, blueberry, tormentil, butcher's-broom, myrtle, olive, mimosa, periwinkle, cypress seed, grape stones oil and vitamins C, K are used as a vascular component. The kella extract, which contains kallkenin, has a marked vasodilatory action and vasoprotective action. It is recommended to put in night cream for cuperose correction. Furthermore, the camouflating cosmetics with green pigments are used for masking redness.

4. **Manual methods.** To avoid thermal and steam procedures, and also irritating a skin procedures. Recommend the massage of neck-collar area with the purpose of adequate venous outflow from the system of facial vein, lymph drain facial massage, plastic massage. As an intensive clearing enzymatic peels are rotined. For the correction of ageing changes, hyperkeratinization, for the intensive clearing of skin and smoothing of relief application of **alkaline peels** are possible. Alkaline peel implies the successive causing on the skin of cosmetic facilities with alkaline and acid properties. Lyes as a potassa and magnesium saponify the components of sebum and lipids of horny layer, instrumental in clearing of skin and making light of overhead layers of horny scales. Lemon acid neutralizes the action of lyes, thus during a chemical reaction an insoluble in water complex appears with a soft abrasive action. Thus, alkaline peel plugs in itself chemical and mechanical components. Conducted 1 time per a month or by a course 1 time per 10 days N 7-8.

5. **Apparatus methods.** To avoid thermal and irritating a skin procedures. Microcurrent therapy is rotined, vehicle lymph drain, endermology, chromotherapy.

**Injection methods:** mesotherapy, introduction of ozone-oxygen mixture to venula. Sclerotherapy involves injecting a chemical agent (sclerosant) into a vein in order to induce local damage and scarring, which causes the vein to



close. Sclerotherapy is used to treat varicose veins as well as medium-to-large spider veins. Injecting small spider veins with sclerosant is too difficult and laborious to be practical. When used appropriately, sclerotherapy is effective in over 80% of patients. For extensive, branched leg spider veins, the long-term success of sclerotherapy partly depends on whether the feeder veins (larger veins feeding into the spider veins) are closed as well. Otherwise, such spider veins have greater chance of recurrence. Serious side effects of sclerotherapy, such as allergic reaction to sclerosant, ulceration or necrosis, are possible but rare. Minor side effects, such as bruising or itching are common but transient. A relatively prolonged (6–12 month) discoloration of the skin along the vein may occur in some people. Not utilized on face.

#### **6. Dermatological methods:**

**Lasers and intense pulsed light.** Hemoglobin, the oxygen carrying pigment in red blood cells, is known to selectively absorb light in a particular range of wavelengths (500–600 nm). When a high-energy beam of such green-to-yellow light is directed at the skin with spider veins, it is absorbed more by the blood than by the rest of the tissue. As a result, dilated vessels heat up, close and are eventually absorbed into the body. This leads to fading and sometimes complete disappearance of spider veins. The good part of this approach is that it is scientifically sound and often works well. It does not require injections or incisions. But there are also drawbacks and limitations. Some people do not respond. Others respond only after several repeated treatments. In some people, results are permanent or at least long-term, while in others, spider veins will recur. There may be discomfort and bruising for a few days after the procedure. As a rule, laser/light treatments work best for small isolated facial spider veins/broken capillaries. Small spider veins in the legs also respond but not as well as facial ones. Laser/light are the least effective for larger, wide spread, branched spider veins in the legs, which, due to size, blood pressure and retrograde blood flow, often do not close or quickly reappear. (For those, sclerotherapy tends to be a better choice.) The equipment used to treat spider veins includes lasers emitting in the 500-600 nm range and intense pulsed light devices with filters allowing to isolate the desired green-to-yellow range.

*Electro-coagulation* of telangiectasias, *radio wave method* of coagulation of vessels.

### **DYSCHROMIAS**

The color of human skin depends on a presence in it coloured matters-pigments main from which is melanin. The role of melanin in pigmentation of skin even for white and unburnt people is very substantial, in what it is easily possible to make sure, looking at the skin of patients albinism or vitiligo. Therefore local hyper- and hypomelanoses are serious cosmetic defects, quite often injuring the psyche of man. In order that cosmetic interference did not

bring harm and was effective, it is necessary well to imagine the mechanism of action of the applied facilities and processes which can be affected in every case. Melanocytes are located in the basal layer. In this location, they produce the pigment melanin in elongated, membrane-bound organelles known as melanosomes. Melanin is packaged into granules which are moved down dendritic processes and transferred by phagocytosis to adjacent keratinocytes.

In the inner layers of the epidermis, melanin granules form a protective cap over the outer part of keratinocyte nuclei. In the stratum corneum, melanin granules are uniformly distributed to form a UV-absorbing blanket which reduces the amount of radiation penetrating the skin.

Melanocytes is large dendritic cell which are disposed among basale keratinocytes and synthesize melanin in the series of successive oxidizing reactions: transformation of Tyrosinum with participation of enzyme of tyrosinase through dihydroxyphenylalanine in a DOPA-quinone, after in a DOPA-chromium with formation of dihydroxyindolcarbonate and dihydroxyindole. Oxidates last polymerized with formation of brown and black pigments, I.e. eumelanines. Red-haired people have the pigment phaeomelanin and their melanosomes are spherical, rather than the more common eumelanin pigment and oblong melanosomes. In a black skin melanin is up-diffused evenly on all of epidermis from basale to the horny layer, and into every keratinocyte – as large melanosomes of elliptic form, reliably coverings the nucleus of cels. In the skin of Europeans melanosomes are concentrated only in a basale layer and unevenly in keratinocytes. Major from all of pigments of skin is melanin, in this connection violations of pigmentation are divided by 2 groups: melanotic and nonmelanotic. Nonmelanotic of dyschromias are conditioned a presence in the skin of coloured substances, gettings in it endogenously with a blood stream or exogenous (as a complications of medicinal preparations, tattoo and other).

**Hypomelanoses** are dyschromias which are characterized diminishing or disappearance of melanin in a skin. Select a melanocytopenotic form, related to diminishing of amount or complete absence of melanocytes: vitiligo, piebaldism, leucoderma caused by chemical matters, Vardenburg syndrome and melanopenotic form, at which amount of melanin either it is lower or it is not quite present: albinism, epiloia, depigmented nevus, inflammatory leucoderma.

*1. Primary hypomelanosis.*

1.1. Congenital hypomelanosis:

Separate diseases:

Pigment-free nevus. Albinism. Piebaldizm.

Syndromes with a depigmentation:

Congenital syndromes:

Tuberous sclerosis.

Inherited syndromes:

Inherited giant grittiness of leucocytes of Vardenburga-Klleine. Syndrome of Mende. Tietze's syndrome. Chédiak-Higashi syndrome. Ziprkovsky-Margolis syndrome.

Idiopathic syndromes:

Alezzandrini syndrome. Fogt-Koyanagi syndrome.

1.2. Acquired hypomelanosis:

Vitiligo

2. *Secondary hypomelanosis.*

2.1. Postinfectious hypochromias:

Pityriasis versicolor. Lichen simplex. Syphilitic leukoderma.

Leprous leukoderma.

2.2. Post-inflammatory hypomelanosis:

Psoriasis. lupus erythematosus. Scleroderma.

Neurodermatitis. Parapsoriasis.

**Congenital hypomelanosis:**

Albinism is often conditioned the defect of synthesis of tyrosinase, when melanin fully absents in a skin, hairs, nails and iris. Total albinism is inherited autosomal-recession. Characterized the complete depigmentation of skin, hairs, eyeground, which are registered right after birth of child. Accompanied an enhanceable sensitiveness to insolation. Skin of milk-white color, hairs silvery-white, eyes – rose. A skin is dry, hypotrichosis is sometimes registered. Often the epitheliomas of skin, keratosis, lowering of vision, hemeralopia, decline of resistance, infections development, sometimes other malformations. Incomplete albinism is inherited autosomal-dominant. Characterized hypochromia (incomplete discolouring) of skin, hairs, iris. Pigmentation increases age out. Other malformans are not present. Partial albinism is inherited autosomal-dominant. Characterized nidal achromia of skin, hair as white spots and strands. The defects of other organs are not present.

Piebaldizm is inherited autosomal-dominant. Characterized the presence of white spots and white strands of hairs with typical localization in middle part of forehead and on temples, on the front side of thorax, in area of stomach, back. Localization lateral or bilateral, rarer medial. Mucous membranes, eyebrows, cilia, are sometimes affected.

Pigment-free nevus is presented the asymmetric depigmented spots of different form and size.

**Syndromes with a depigmentation.** An congenital disease is an epiloia. Characterized a triad, including a neurological syndrome (epilepsy, tumour of brain), psychical syndrome (oligophrenia) and dermatological syndrome (angiofibromas, periungual fibromata, shagreen spots, spots-leaves, spots-confetti). Accompanied the defects of eyes and internalss. Pathohistologically is marked gliosis a maters).

Inherited syndromes with a depigmentation. The syndrome of Chédiak-Higashi syndrome is characterized the affects of eyes, skin and blood. From the side of skin is partial albinism, hyperhidrosis, dystrophy of hairs, polychromias of the opened areas of skin. From the side of eyes is a cataract, photophobia. From the side of blood is anaemia, thrombocytopenia, leukopenia, hepatosplenomegaly. The syndrome of Vardenburga is characterized a skin pathology (partial albinism, piebaldism, hypertrichosis of medial areas of eyebrows and other areas), bone pathology (dysplasia of facial skeleton, spina bifida, aplasia of bones and joints), other pathology (deafness, pathology of heart). Syndrome of Mende is a ill-defined form of previous syndrome.

The Tietze's syndrome is characterized the depigmentation of skin and hairs, deafness, hypogenesis of eyebrows.

The syndrome of Ziprovsky-Margolis is characterized hypopigmentation, surdomutism. Men are ill only.

**Idiopathic syndromes.** The syndrome of Alezzandrini is characterized a hearth depigmentation, one-sided canities, one-sided retinitis, one-sided blindness, sometimes by deafness.

The syndrome of Foght-Koyanagi is characterized depigmented spots, bilateral uveitis, alopecia.

**Enzymopathias.** A phenylketonuria is characterized hypopigmentation, allergy, oligophrenia. A skin is dry, injured easily. Hairs are light, eyes are blue, dystrophy of nails, hyperhidrosis, dermatites, higher photosensitiveness of skin. The block of transformation of phenylalanine to tyrosinum is underlaid in Disease. Treatment is foreseen by limitation of albumens and phenylalanine. A histidinemia is characterized light hairs, blue eyes, muscular rigidity, spastic paresis, oligophrenia. The defect of histidase and violation of exchange of histidin is underlaid of disease. Treatment consists in limitation of albumen in a food ration and translation on a feed albuminous hydrolyzates.

**Acquired hypomelanosis.** Vitiligo is characterized absence of melanocytes on the damaged area. Theories of origin: neurogenic, immune, self-destruction, inherited, psychosomatic. Characterized depigmented spots, sometimes with a polychromia on periphery. Localized on any area of a skin cover. Vitiligo is distinguished on the sizes of spots (limited, moderate, widespread, generalized), on localization (acrofacial, nidal, vulgar), course (stabilized, slowly progressing, quickly progressing, fulminant), by appearance spots (focal, segmental, zoster-like, reticulated, point). Procatarxiss are a friction, traumas, insolation, stresses, action of chemical matters. A disease is accompanied the disbalance of the immune system, sympathicotonia, psycho emotional disorders.

Phenol and its derivatives can induce hypo- and depigmentation. At a direct contact causes an exogenous depigmentation, similar with vitiligo. A phenol influence on melanocytes, represses a tyrosinase, blocks the synthesis of

DOPA, violates the biosynthesis of premelanosomes and melanosomes, blocks a transfer them in keratinocytes. Derivatives of phenol are in rubber clothes, machine oil, facilities of disinfection.

**Correction of hypomelanosis.** Congenital hypomelanosis is nontreatment. It is necessary to utilize a sunscreens.

Treatment of secondary hypomelanosis is unreasonable, because it is necessary to treat a basic disease, functional activity of melanocytes is restored independently.

The cosmetic correction of hypomelanoses is ineffective. Recommend the use of camouflaging cosmetics and autobronzates, intradermal tattoo, discolouring of surrounding skin (chemical peel, dermabrasion). The autoplasmic transplantation of skin graft is used for vitiligo treatment. Consultation of dermatologist is obligatory.

**Hypermelanosis.** Surplus of melanin in a skin can be deposited in an epidermis, colorated to brown colour or in derma, colorated to grey or blue tint. Hypermelanosis can be primary and secondary. Primary is a large group of diseases and syndromes, at which hearth or diffuse pigmentation is a leading clinical sign, often unique, however possibly it combination with other symptoms. This pathology is subdivided into congenital, inherited and acquired. Hypermelanoses, which arise up during life of man under act of external unfavorable factors, diseases of internalss, infectious and parasitogenic diseases, metabolic disturbances cover to the acquired and subdivide into the limited and diffuse forms.

*1. Primary hypermelanosis.*

1.1 Congenital hypermelanosis:

Pigmented nevus. Lentigo juvenile. Incontinentia pigmenti

1.2 Inherited hypermelanosis:

Ephelidess. Melanizm. Lentiginosis inherited. Periorificial lentiginosis

1.3 Acquired hypermelanosis:

1.3.1 Limited hypermelanosis:

Chloasma. Melazma. Linear pigmentation of forehead.

Pigmental perioral dermatitis .

1.3.2 Diffuse hyperpigmentations:

Addison's disease and other endocrine melanodermas. Cachectic melanodermia.

1.3.3 Toxic hyperpigmentations:

Military melanosis. Poikiloderma reticularis pigmentosa faciei et colli.

Toxic melanoderma. Medicinal melanodermas.

1.3.4 Artificial hypermelanosis:

Actinic melanoderma. Marble pigmentation of skin. Parasitic melanoderma.

*2. Secondary hypermelanosis.*

2.1 Postinfectious melanoderma:

Syphilitic melanoderma. Tuberculous melanoderma.

2.2 Post-inflammatory melanodermas:

Lichen ruber planus. Limited neurodermatitis. Knotted prurigo.

Scleroderma. Hives. Eczema. Pyoderma. Bullous dermatosis.

### **Congenital hypermelanosis.**

*Pigmented nevus* – flat or slightly overpeering umber formation with a wavy surface. Select a few clinical varieties of pigmented nevus from which to actually hypermelanosis it is possible to take epidermic-dermic nevus, intradermal nevus. Epidermic-dermic nevus differs from all of other varieties from capability of the malignant transformation to a melanoma. Therefore removal or correction of color and sizes of pigmented nevi in the cosmetologic institutions not recommended.

*Lentigo*. Rounded, flat or slightly overpeering spots of brown color of different intensity on any area of body. Lentigo arise up in childhood (juvenile freckles) and have two periods of more or less active distribution: to 9 and from 16 to 20 years. Appearance them in a sear and yellow leaf with localization on face, rear of предплечий and brushes estimate as "senile lentigo".

*Liver spots* – rather yellow-brown, wrong or rounded form, smooth formations, size from some mm to some tens of sm. Localization any.

### **Inherited hypermelanosis.**

*Ephelidess* are inherited autosomal-dominant. Small, hazel spots in the places of most insolated. More frequent than all are for people with 1–2 phototypes of skin, blonds and red.

*Melanizm* is the diffuse darkening of skin of face, skin folds, epiarticular skin. Appears from birth. Autosomal-dominant is inherited.

#### *Lentiginos*

– *inherited* is conditioned an autosomal-dominant transmission, localized on any area of skin, shows up from birth. Presented the lentigo elements.

– *central-facial* autosomal- dominant is inherited. Lentigo is localized in a center a face as the horizontal located area. Accompanied a hypertrichosis, absence of upper incisor, high palate, scoliosis, pressed breast, deformation of skull, mental deficiency, epileptiform fits.

– *periorificial lentiginosis* (Peutz-Jeghers' [Peutz-Touraine] syndrome). Lentigo round a mouth, nose, on hands, feet, on mucous membranes of cavity of mouth. Accompanied with intestinal polyposis.

### **Acquired hypermelanosis.**

Include all of cases of melanogenesis activation caused by physical (mechanical, temperature, ray), chemical, toxic (professional and medicinal) influences, diseases of internalss and systems, infectious, parasitogenic diseases, metabolic disturbances.

### **Limited forms.**

*Chloazma* is darkly-yellow and brown spots of wrong outlines with sharp borders. Disposed on face (cheeks, forehead, temple). Varieties: chloasma of pregnancy, at pathology of uterus and ovaries (chloasma uterinum), chloasma from the using of hormonal contraceptives. At pregnant the polychromias of middle line of abdomen skin, nipples, genitals are also registered, and «mask of pregnancy» (polychromia of superciliary arcs and eyelids).

*Melazma* – other chloasmes, unconnected with organs reproductions.

*Melasma solare* – melasma as a result of insolation

*Melasma hepatica*– melasma on the lateral surface of neck, often accompanied with telangioectasias.

*Linear pigmentation of forehead* is spots of color coffees with milk, going horizontally on the middle of forehead by the width of 1 sm with passing to the cheeks. Often accompanies with organic pathology of the nervous system. Cosmetic treatment is inadvisable.

### **Diffuse hypermelanosis.**

Addison's disease (bronzed skin) is dermatomelasmas, especially on opened areas, having a different tint: lemon-yellow, dirtily-brown, sallow complexion. Accompanied darkening of hairs, polychromia of mucous membranes. Arises up at the defect of adrenal cortex, tuberculosis of adrenal cortex, tumour of adrenal cortex, haemorrhage and syphilis of adrenal cortex, at a parafunction hypophysis. Other symptoms are a weakness, decline of mass of body, adynamy, low blood pressure, glucopenia, disorder of GIT.

Other endocrine hypermelanosis:

- hypercorticoidism (Cushing's syndrome)
- hyperestrogenism
- hypophysial insufficiency
- pathology of thyroid

*Cachectic melanoderma* arises up at a cachexy, accompanying a cancer, tuberculosis, peritonitis. Clinically shows up dirtily-brown pigmentation of skin of stomach, genitals.

*Toxic hypermelanosis* consist in the combined influence of different chemical factors (including photosensibilisations ) and ultraviolet rays.

*Military melanosis* arises up for excitable women 30-40 years, outliving a war-time. Accompanied an malnutrition, hypovitaminosis. Characterized by photodermatitis, but in place of sunburn there are small spots of yellow-brown color with a violet tint. Localization is a face, hands.

*Poikiloderma reticularis pigmentosa faciei et colli* arises up for women in the period of menopause. On the lateral surfaces of neck there are symmetric reddish-brown reticulated spots, telangioectasias, dryness and atrophy of skin.

*The toxic melanoderma* often arises up at workers, drivers, at persons, contacting with petrochemicals (petrol, kerosene, oils). Localization – hands, forearm. Often there are oily acne, follicle hyperkeratinization are registered. For women, using of poor quality cosmetics with mineral oils eruptions localized on the places of contact with cosmetic preparations. More frequent than all suffers skins of face, hands.

*A medicinal melanoderma* is characterized polychromias because of activating melanogenesis by sulfanilamides, arsenic, barbiturate, quinine, phenolphthaleinum, pyramidonum, antipyrine and other. A mechanism is not clear.

Cosmetologist can meet iatrogenic hypermelanosis are consequences of different cosmetic procedures. One of reasons of their development are injuring influences of different types of peels, procedures on treatment of acne, plastic operations, dermatosurgical methods, and other manipulations with violation of integrity of skin. A large role is played by the inherited predisposition. Initiating agents are frequent reiteration of injuring influences, slow cicatrization of the damaged tissues, attended with the protracted edema, active insolation. Cosmetic and medicinal facilities, containing matters witha potential photosensitizers are also able to change pigmentation of skin. Among such preparations select, for example, a paraben which long time was added to antisen creams as a chemical filter. The immoderate use of matters which thin a horny layer can stipulate discoloration skin on occasion. Fruit acids, salicylic acid, retinol and its derivates, enzymes, behave to the last.

**Risk factors of iatrogenic hypermelanosis:**

- *peels (chemical, enzymatic, laser vaporization, mechanical dermabrasion, laser epilation)*
- photosensitizers in cosmetic facilities (PABA)
- thinning of horny layer (using cosmetics and medicines contained AHA, retinol, salicylic acid, enzymes)
- after plastic operations and dermatosurgical influences
- at using a solarium

A mechanism of origin are thinning of epidermis, sensitisation to the ultraviolet rays, distributing of melanin between less of keratinocytes, strengthening of melanogenesis in reply to a damage and inflammation. A laser causes the direct activating of melanocytes.

**Correction of hypermelanosis.** Consultation of specialists (dermatologist, internist, gynaecologist, endocrinology). Pigmented nevus needs supervision, it is possible to apply a cryodestruction, electro-coagulation. Acquired hypermelanosis (ephelidess, chloasma, melasma) need application of cosmetic bleaching facilities, sunscreen facilities, the peel is used in a cold period of time. Toxic, artificial hypermelanosis needed in the removal of reason and basic pathology. Secondary hypermelanosis does not require treatment and disappear independently. On occasion recommend a cosmetic correction (postacne, iatrogenic hypermelanosis).

**1. System correction** – recommended the antioxi-dants protractedly, especially vitamin E.

**2. Individual cosmetic care.**

*Hydroquinone* is one of the best-established topical agents for reducing skin pigmentation, often viewed as the golden standard of skin lightening. Its effectiveness, both alone and in combination with other treatments, has been documented in a large number of clinical studies. It works by inhibiting the enzyme tyrosinase, thus blocking a critical step in the synthesis of melanin (dark skin pigment). Hydroquinone does not bleach skin in the sense that it



does not destroy previously synthesized melanin. Hydroquinone treatment usually takes several weeks to produce results because even though the synthesis of new melanin is blocked quickly, the existing melanin takes a relatively long time to migrate out of the skin in the process of natural exfoliation. To speed up the effects, hydroquinone or other melanin synthesis inhibitors are sometimes combined with exfoliating agents, such as alpha-hydroxy acids. However, since both hydroquinone and many exfoliants are potential skin irritants, combining them increases the risk of skin irritation. Hydroquinone is available in concentrations of 0.5–2 % over-the-counter and 4 % or even higher by prescription. Side effects of short-term use tend to be mild and non-systemic, especially for low-to-medium strength formulations. Unfortunately, animal studies of very high doses indicated the potential of hydroquinone to cause cancer. Also, hydroquinone has been reported to cause ochronosis, a bluish black discoloration of tissue. This complication is relatively rare with short-term use of low-to-medium concentrations. However, prolonged use of high concentration, especially in dark skinned people, appears to cause ochronosis relatively frequently.

*Kojic acid* is a naturally occurring substance produced by some species of fungi. Similarly to hydroquinone, it suppresses the production of melanin by inhibiting the enzyme tyrosinase. Kojic acid appears to be comparable in effectiveness to hydroquinone as a skin-lightening agent. However, kojic acid is relatively unstable in skin care formulations. It easily oxidizes on contact with air and also reacts with other chemicals if exposed to sunlight. To bypass this problem, some skin care companies use kojic acid dipalmitate, a more stable derivative. It remains unclear whether kojic acid dipalmitate is equivalent or even close to kojic acid in effectiveness. Kojic acid dipalmitate needs to be studied head-to-head against kojic acid and/or hydroquinone. Finally, some controversial research has raised the issue of carcinogenicity of kojic acid. A special cancer susceptible strain of mice developed liver tumors when fed large amounts of kojic acid for 26-weeks. The relevance of this finding to topical use in humans, if any, remains unclear.

*Azelaic acid* is a naturally occurring chemical belonging to the class of dicarboxylic acids. In skin care, it is most commonly used to treat acne. However, azelaic acid also reduces melanin production by inhibiting (largely indirectly) the enzyme tyrosinase. It also suppresses the proliferation of abnormal melanin producing cells (melanocytes), apparently by reducing the rate of DNA synthesis. Azelaic acid has been used to treat melasma, lentigo maligna and other hyperpigmentation problems. Topical azelaic acid has no or little depigmentation effect on normally pigmented skin, freckles, age spots (solar lentigines), and nevi. Apparently, azelaic acid is much more active against abnormal melanin synthesis and abnormal melanocytes. In the US, azelaic acid (20%) is approved as acne treatment but is sometimes used off-label for hyperpigmentation. A 24-week study in South America found that a

20 % concentration of azelaic acid was equivalent to 2 % hydroquinone in the treatment of melasma. A study in the Philippines found that 20 % azelaic acid was superior to 2 % hydroquinone. Some individuals who develop irritation on hydroquinone may tolerate azelaic acid. Recent safety concerns regarding hydroquinone, whether substantiated or not, make azelaic acid a more attractive skin lightening alternative for melasma and some other hyperpigmentation disorders. However, as opposed to hydroquinone, azelaic acid is not very effective against freckles and age spots.

*Topical retinoids*, such as *tretinoin* 0.05–0.1 %, have been used in the treatment of melasma and other hyperpigmentation problems. When used alone, retinoids appear to be considerably less effective than hydroquinone and they may take up to six month or more to achieve visible results. Retinoids seem to reduce hyperpigmentation by accelerating epidermal exfoliation (sloughing off of epidermal cells), which leads to a greater loss of epidermal melanin. It has been suggested that retinoids may also reduce melanin synthesis by indirectly inhibiting tyrosinase, but this is not well supported by evidence. In patients who do not sufficiently respond to tyrosinase inhibitors like hydroquinone, adding tretinoin appears to improve effectiveness, possibly because their mechanisms of action are complementary. On the other hand, both retinoids and hydroquinone are potential irritants. Skin irritation, especially if intense and/or prolonged, may actually worsen pigmentation problems by causing to so-called postinflammatory hyperpigmentation. Hence the combination of retinoids and hydroquinone should be used with particular caution.

*Alpha hydroxy acids* used at typical OTC strengths (5–15 %) are ineffective as hyperpigmentation treatment. However, exfoliation that AHA produce increases the turn over of epidermal cells causing more melanin to wash out of the skin. As a result, AHA may enhance the effectiveness of other treatments, such as hydroquinone or other tyrosinase inhibitors. High strength AHA peels applied by a physician may be somewhat effective in reducing skin discolorations.

**1. Manual methods.** Chemical peels (AHA, TCA, phenol, resorcin paste). The prophylaxis of polychromias consists in a reception before manipulations of antioxidants, vitamins A, E, omega-3 fat acids systemic during 1–2 months. 6-8 weeks prior to manipulation external preparations of vitamin of C, hydroquinone, retinoids are recommended. It is necessary to utilize photoprotective facilities.

Cryomassage, bleaching programs, including enzymatic peels, bleaching serums and masks are used.

**2. Apparatus methods.** Ultrasonicphresis of hydroquinon, toperhydrol ointment or gel, resorcin ointment. Electrophoresis by the bleaching preparations. Ultrasonic peel. Microcurrent therapy.

**3. Injection methods.** Mesotherapy.

## **SEBACEOUS GLANDS DISEASES. SEBORRHEA. ACNE. ROSACEA.**

The oil on the surface of skin is a complex mixture of sebum, lipids (from the surface skin cells), sweat and environmental material.

Sebum is produced by sebaceous glands. These are found over most of the body, although there are few on the hands or feet and none on the palms and soles. Sebaceous glands on the mid-back, forehead and chin are larger and more numerous than elsewhere (up to 400–900 glands per square centimetre). They are also numerous in the ear canal and around the genitals.

The sebaceous gland consists of lobes connected by ducts, which are lined with cells similar to those on the skin surface.

Most sebaceous glands open out into the hair follicle. Some free sebaceous glands open directly onto the skin surface. These include Meibomian glands on the eyelids, Tysons glands on the foreskin and Fordyce spots on the upper lip or genitals.

Sebum is produced when the sebaceous gland disintegrates. The cells take about a week from formation to discharge. Sebum is a complex and variable mixture of lipids including:

- Glycerides
- Free fatty acids
- Wax esters
- Squalene
- Cholesterol esters
- Cholesterol

Triglycerides produced by sebaceous glands are broken down by bacterial enzymes (lipases) in the sebaceous duct to form free fatty acids.

Sebum has the following functions:

- It reduces water loss from the skin surface
- It protects the skin from infection by bacteria and fungi
- It contributes to body odour
- It is colonised by the bacteria *Propionibacterium acnes*, which may have a role in immune regulation

• Sebum production is under the control of sex hormones (androgens). The most active androgens are testosterone, 5-testosterone (DHT) and 5-androstene-3 $\beta$ -diol. These hormones and others are made by the sex glands (ovary in females, testis in males) and by the adrenal gland. These glands are in turn under the influence of the pituitary gland, located in the brain.

• Androgens are made more active by enzymes in the skin and sexual organs. Type I 5- $\alpha$  reductase acts in the skin and Type II 5- $\alpha$  reductase acts in the sexual organs. These enzymes convert less active androgens into the active testosterone and 5-testosterone (DHT). These more active androgens stimulate sebaceous gland cells to produce more sebum.

- The role of progesterone is unclear. Females produce more sebum in the week before their menstrual period when progesterone levels are higher. But progesterone is known to reduce the activity of the enzyme 5- $\alpha$  reductase that one might expect to reduce sebum production.

**A seborrhea** is the genetically determined disease, characterized a parafunction oil-glands, quantitative and qualitative changes of sebum. A basic nosotropic value has violation of physiological balance between estrogens and androgens toward predominating of androgens as a result of violations of activity of sexual glands, hypophysis, suprarenal glands, functional state of the nervous system, deficit of some vitamins and oligoelements from an inefficient feed or diseases of GIT.

Depending on consistency and chemical composition of sebum distinguish the types of seborrhea: oily (liquid and concrete), dry and mixed.

**A oily seborrhea** is observed in the period of pubescence, when the secretory function of oil-glands rises. Mainly arises up on face, hairy part of head, breast. A skin is shining, oil, dirtish-grey, the orifice of hair follicles are extended. On hairy part of head a lot of scales and crusts yellow and white colors are marked. A seborrhea oleosa is divided by liquid and concrete. The course of liquid seborrhea oleosa is chronic with remission at summer time. A disease is connect with vegetative neurosis. A sebum has liquid consistency. Hairs oily, stick together and thinned, after washing quickly become oil. The amount of the secreted liquid sebum is sharply increased. A skin is shining, pores gape, there are single comedones and superficial papulo-pustular acnes. At a concrete seborrhea a skin becomes compressed, dead colour, whitish-grey color, on its surface the extended orificess of oil-glands are marked are «pores», thick secret with an unpleasant smell. Hairs are thick, wiry, rough. At a concrete seborrhea a sebum is thick, its evacuation is laboured, as a result comedones develop. Deep papulo-pustulas appear, acne conglobata, atheromas, the deep forms of acne develop, scars stay after resolution of them. An oily seborrhea predisposes to development of acne diseases, alopecia.

**A dry seborrhea** is often observed for children up to pubescence because of insufficient development of sebaceous-hair complex, but can develops in any age. Characterized dryness of skin, decorticating, redness. The abundant decorticating appears on hairy part of head, dryness of hairs, their thinning is marked. An eczematization and defluxion can develop. A dry seborrhea predisposes to development of seborrheic dermatitis.

**The mixed seborrhea** themen are ill mainly. Characterised by oily seborrhea on face and in area of hairy part of head – dry. There can be the mixed form of oily seborrhea at which on face of display of liquid and on hairy part of head – concrete oily seborrhea.

**Seborrheic dermatitis** is a chronic inflammatory disease, affected those areas of skin, head and trunk, where oil-glands are developed. Agent of seborrheic dermatitis (SD) – *Pityrosporum ovale*. It is yeast-like lipophilic fungus, which is the component of normal microflora of skin more, than at 90 % population. Thus oval form – *Pityrosporum ovale* more frequent meets on the skin of hairy part of head, and round – *Pityrosporum orbiculare* – on the skin of trunk. Funguss are concentrated round oil-glands and utilize their secret as source of fatty acids, necessary funguss for growth and development. At certain conditions an organism is lost by ability to control growth of fungus and retain them in the saprophyte state. In a norm the microflora of hairy part of head contains 46 % *Pityrosporum ovale*, at a scurf (weak form of SD) it on 74 % consists of them, and at SD the amount of these fungus arrives at 83 %. Hyperactivating of mycotic microflora is promoted by nervous stresses, hormonal factors (neonatal period, pubertal period, hyperandrogenism), immune factors (general dissemination of SD at patients with immunodeficiency, presence of nidus of chronic infection), genetic and metabolic factors (burdened familial history, pathology of GIT), influence of external environment (winter period, hyperhidrosis, using of alkaline cleansers, improper feeding).

SD typically cases those areas of a skin, which are characterized considerable development of oil-glands and their overactivity. Basic symptoms are decorticating, itch, inflammation of skin (erythema, infiltration). A classic variant is a symmetric lesion of skin of hairy part of head, border of growth of hairs, eyebrows, ciliary border, area of beard and moustaches. A forehead, nosolabial folds, external acoustic meatus and parotid areas. On a trunk, lesions localized in area of breastbone, folds of skin (including axillary and inguinal) round a umbilicus, skin under mammary gland for women, anogenital area. In a difficult case SD can have character of widespread exfoliative process, up to an erythrosis. On the skin of hairy part of head the lesions have character of the lamellar decorticating. This variant of course of SD is not accompanied the acute inflammatory process and considered as a dry seborrhea. Sometimes there is a skin itch. A difficult case of SD on hairy part of head are characterized erythematose spots and plaques, covered fine or greasy scales, on occasion by rather yellow scales and crusts and hemorrhagic crusts caused by scratch. At the some patients the affected area takes the line of hairs growth and skin of forehead. Manifestation of SD on face, parotid areas and external acoustic meatus determined as erythematouse and squamous itching lesions. Thus patients complain of burning on those areas. In a number of cases papulae on the skin of cheeks, forehead, nasobuccal folds can appear. Addition of the second infection is possible.

## **Cosmetic treatment of seborrhea.**

**1. Consultation** of dermatologist, at a necessity endocrinologist, gynaecologist, gastroenterologist and other.

**2. General treatment**, prescribed by a doctor: antiandrogens, oestrogens and blocker of 5- $\alpha$  reductase, as well as enterosorbents, sedative facilities, vitamins and oligoelements and other. External treatment consists of the use of seboregulators, keratolytics, antiseptics, antibacterials and antifungous facilities in topical medicated, sometimes corticosteroids.

**3. Diet.** Limitation of fat, flour, sweet dishes is recommended. Spicy, smoked foods, full cream milk, alcohol must be limited. Soul-milk low-calorie food, fish, vegetables and fruit must prevail in a ration.

**4. Individual cosmetic care.** The emulsions, gommages, alcohol-free tonics and foamy gels are recommended at a dry seborrhea and seborrheic dermatitis. After then patients can use emulsions. The use of masks is recommended with a antiinflammatory, moistening and calmin action. All of cosmetics must be with marking of not comedogenic. For hairy part of head the special shampoos and lotions are recommended. Cosmetics for a dry seborrhea and seborrheic dermatitis contains antibacterial and antifungous components (zinc, coppers, vegetable extractions of eucalyptus, garlic, black poplar, black pepper, tea tree, rosemary, irish moss, ylang-ylang, elecampane, silver fir, sweetflag, in shampoos utilized Clotrimazolom, Climbasolum, Miconasolum, wood tar and other), restructuring an epidermal barrier (ceramides, linolic acid, lecithin, evening primrose oil, borago oil, blackberry oil and other), moistening (hyaluronic acid, derivatives of chitin, AHA in low concentrations, silicones and other), vitamins and oligoelements (A, E, F, zinc, sulfur in organic compounds and other), antiinflammatory, keratolytic (AHA, enzymes, salicylic acid), regenerating (panthenol, allantoin, bisabolol and other) substances.

At the care of oily seborrhea a 2 times per a day clearing foamy gels, lotions, scrubs, with the subsequent use of matting emulsions and gels. The using of seboregulators (derivates of vitamin A, 18-b-glycyrrhetic acid in combination with zinc, vegetable extracts of burdock, cabbage of cultivated cabbage, cedar, silver fir, horse-radish, black poplar, rosemary, corn-flower, fluellin, field horse-tail, bugleweed, nettle, algae, root of glycyrrhizas, extract of green tea, blockers of 5- $\alpha$ -reductase (extract of palmetto or, phytoestrogenes, catechines of green tea, zinc,  $\gamma$ -linolenic acid, oleanolic acid), antiseptic (miramictin, triclosan, vegetable extracts of calendula, camomile, burdock, cabbage, cedar, silver fir, horse-radish, elder, black poplar, rosemary, laminaria, nettle, cowberry, grapefruit, green tea, kiwi, orange, papaya, passionflower, five-finger, peach, pineapple, lemon, thyme, bergenia, water mint, needle, quinine bark, water-plants, juniper, olive leaves, carnation, highlander snake and bird and other), sorbent of oil (silicon, aluminium silicates, calcium, polymeric granules, clay and other), rehydrants and other substances.

**1. Manual methods:** peels (enzimatic, phytopeel, gommage, superficial chemical peel), massage after Jacques, masks (with clay, kaolin, water-plants, freshwater sponge, paraffin and other), cryomassage and other.

**2. Apparatus methods:** vaporization, desincrustation, brossage, d'arsonvalization, vacuum cleaning, galvanization, iontophoresis of the special cosmetic solutions, microcurrent therapy, ultrasonic peel, ultrasonic phoreris of the cosmetic gels, sand-blast dermabrasion.

**Acne rosacea.** Chronic skin disease which is localized on face. As a rule, begins on third - fourth ten of years of life and strikes women mainly.

Predisposing factors:

1. Insolation
2. Sharp changing of temperature condition and influence of hot steam, hot food and drink.
3. Abuse of alcohol, spicy and smoked products
4. Stresses
5. Presence of acarus demodex folliculorum.

**Etiopatogenesis.**

- angioneurosis because of disfunction of the vegetative, central nervous and endocrine system, functional insufficiency of facial vein;
- violation of cerebral influence on the blood vessels of face skin and weakness of blood and lymphatic vessels draining of face skin;
- insolation, sharp changing of temperature condition and influence of hot steam, spicy and hot food, alcohol, what lead to reflex expansion of blood vessels of face;
- violations of the immune system and increase of level of vasoactive peptids;
- diseases of GIT, especially hepatobiliary systems;
- pathology of the endocrine system (intensifying of disease in the period of climax, pregnancy, before menstruation).
- infection (demodex folliculorum).

**Clinic.** The skin of cheeks, nose, forehead, chin is most often affected. Rarely area of decollete, round eye most morphological elements: erythema, telangiectasias, red papulae, pustulas. Characteristics of rosacea include:

- Red papules and sometimes pustules on the nose, forehead, cheeks and chin. Rarely it involves the trunk and upper limbs.
- Frequent blushing or flushing
- A red face due to persistent redness and/or prominent blood vessels – telangiectasia
- Dry and flaky facial skin
- Aggravation by sun exposure and hot and spicy food or drink (anything that reddens the face)

- Sensitive skin: burning and stinging, especially with make-up, sunscreens and other facial creams
- Red, sore or gritty eyelid margins including papules and styes (blepharitis and/or conjunctivitis) – ocular rosacea
- Enlarged unshapely nose with prominent pores (sebaceous hyperplasia) and fibrous thickening – rhinophyma
- Firm swelling of other facial areas including the eyelids – blepharophyma

**Stages of rosacea (J. K. Wilkin, 1994)**

1 stage	2 the stage	3 the stage	4 the stage
Prerosacea	Vascular rosacea	Inflammatory rosacea	Late rosacea
Transient erythema and hyperemia	It was swollen and ophthalmorosacea, prof erythema and telangiectasia	Papulae and pustulae	Rhinophyma

**Classifications** (G. Plevig and Th. Jansen).

1. Erythematous rosacea. Flood-tide erythema duration of which hesitates from a few minutes to a few hours. Accompanied feeling of heat, disappears without trace. Disposed in central part of face and naso-labial folds. In future on a background prof erythema capillary telangiectasias are formed.

2. Papular rosacea. On a background erythema and diffuse infiltration rose-red papulae appear by a diameter 3–5 mm.

3. Pustular rosacea. At further progress of disease many papulas are exposed to suppuration, as a result pustulas 1–5 mm in a diameter appear with yellow or greenish content, having a sense to the groupment, especially in area of nose, nosolabial folds and chin. There is expressed oedematousness of face especially in area of eyelids, narrowing of eye cracks. Passing of pouring out is possible to the front surface of neck, and even to the breast.

4. Infiltrative-productive rosacea. At a chronic flow formation of inflammatory papules infiltrates, tumular excrescences are possible due to hyperplasia of oil-glands and connecting fabric and prof extended vessels. Further development of disease for men approximately in 10 % cases transformed in rhinophyma (bulge of tissue of nose with the hypertrophy of oil-glands, new formation of vessels and jumboizing organ), development of otophyma (affect of ear-lobe) is possible, gnathophyma (affect of skin of chin), methophyma (pillow-shaped thickening of skin of forehead).

Often rosacea combines with conjunctivitis, blepharitis, keratitis.

**Special forms of acne rosacea.** Steroid rosacea develops after topical application of corticosteroid preparations. Can arise up in any age. Equally with basic elements rosacea can be areas of easy atrophy. Withdrawal syndrome is characterized when in 7–10 days the sharp intensifying of a skin process comes after stopping of the topical steroid use.



Granulomatous rosacea. Appearance of skin rash is localized mainly in periorbital and perioral areas and presented smooth, brilliant, reddish-brown papulae in a diameter 2–4 mm, rounded form, run into and form an tuberos surface. At diascopy yellow-brown spots come to exposed quite often, that can result in erroneous interpretation as a sign of «apple jelly» at tuberculosis lupus.

Conglobata rosacea characterized appearance of nodules of blue-red or reddish-brown color, spherical form to 1.5–2 sm in a diameter on a background other symptoms of rosacea.

Fulminant rosacea arises up suddenly, on a background general health of organism. An edema, cherry reddish-cyanotic or cyanotish-red erythema, papulae, pustules, large nodes are formed, quite often with fluctuation and brown-yellow crusts on the surface. Accompanied with sickness, burning, itch, sense of contraction of skin.

Gram-negative rosacea arises up as a result of the protracted general or local antibiotic therapy. Sudden appearance of folliculitis is possible, gram-negative bacteria discover in content of which. It takes a place as a result of death of highly sensitive gram-positive flora (*S. saprophyticus*, *S. epidermidis* and other) and occupation of ecological niche by gram-negative bacteria of groups of *Pseudomonas*, *Proteus*, *Klebsiella*, *Acinetobacter*. Thus in area of chin, naso-labial folds and cheeks shallow numerous pustulas are localized 2-3 mm in a diameter with yellow content. At an infection, caused *Proteus* cyanotish-red or reddish-brown oedematous papulae, small nodes and cystophorous formations are formed in perinasal and perioral areas.

Ophthalmorosacea is an engaging of eyes in a pathological process, which is observed at 20–60 % patients. Blepharitis, chalasion, conjunctivitis, iritis, iridocyclitis, keratitis are possible.

Rosacea with solid persistent edema (illness of Morbigana) characterized by oedematousness and erythema of overhead half of face. Brightly-rose erythema and oedematousness of forehead, superior eyelids, bridge of the nose appears. Single papulae, telangiectasias, appear on this background. A process is chronic, persistent, with forming of sclerodermatous edema.

### **Cosmetic treatment of acne rosacea**

1. **Consultation** of dermatologist, when necessary endocrinology, gastroenterologist and other. Before the leadthrough of procedures necessarily to do an analysis on demodicosis.

2. **Mode.** It is recommended to avoid insolation, use sunscreens with the high degree of protect. Do not to use food and drinks in a hot kind (to drink tea and coffee warm), fizz, alcohol, peppered spicy food, to avoid influence of hot steam (sauna, steam bath-house, abuse of cooking). To avoid the use of topic glucocorticoids, especially fluorine-containing.

3. **Individual cosmetic care.** Use of cosmetic facilities with a antiinflammatory, antiseptic and vascular components, providing the delicate care like for sensitive skin. Vascular substances work as a capillaroprotectors (vitamin of C, bioflavonoids of grape, green tea and other) improve microcirculation and drainage (a hesperidin methyl chalcones, extract of maidenhair tree). Preferable forms are emulsion, tonic, thermal water, mussels.

Also cosmetics contains photoprotect filters and, sometimes, green pigments for camouflaging of red colour. In the initial stages of disease it is necessary to remind the patient of necessity of double (morning and evening) rotary facial self-massage by circular stroking movements of area of nose, forehead and cheeks during a few minutes.

4. **Manual methods.** Lymphdrine massage (1–2 stages), masks (antiinflammatory, detoxing, antiseptic, calmativ, vascular) are creamy, alginate, alkaline chemical peels, enzymatic peels, cryomassage.

5. **Apparatus methods.** Microcurrent therapy, ultrasonic peel, apparatus lymphdrine.

6. **Injection methods:** oxygen mesotherapy, ozon therapy.

7. **Dermato-surgical methods.** Electro-coagulation of telangiectasias and deep infiltrated and papulo-pustular elements, radiowaving coagulation of telangiectasias, selective photothermolysis by laser pr LHE. Standard dermabrasion (phyomas), laser dermabrasion by a carbon-dioxide and argon laser (phyomas).

**Acne** is a chronic recurrent dermatosis, has a quantivalent starting factors, torpid clinical course and low effectiveness of the conducted treatment. *Causes of acne.* Development of acne requires a combination of several factors, which are influenced mainly by heredity, age and gender. Lifestyle factors, such as diet or grooming habits appear to play a minimal role.

Some of the factors believed to contribute to the development of acne are:

- **Hormonal levels:** Certain hormones, particularly androgens, such as testosterone and dihydrotestosterone (DHT), promote acne. Of importance are not only absolute levels of these hormones but also the levels relative to other hormones, such as estrogens and progestins. Acne tends to flare up when levels of androgens increase either absolutely or relatively to other hormones. This is one of the main reasons why acne flare-ups are linked to puberty and menstrual cycles.

- **Excessive sebum production:** Excess sebum from overactive sebaceous glands is an important factor in acne. Excess sebum is most often caused by increase in absolute or relative levels of androgenic hormones (see above). Sebum production may also be increased by stress and heat.

- **Stress:** There is some preliminary evidence that stress may exacerbate acne. The proposed mechanisms of this effect include altered hormonal levels (such as CRH and adrenal hormones) and suppression of immune system linked to stress.

- **Accumulation of dead skin cells:** Excessive shedding of dead skin cells can plug the pore, creating a nutrient-rich anaerobic (oxygen-free) environment conducive to overgrowth of acne-causing bacteria.

- **Bacteria:** Bacteria are part of the normal microflora residing in pores. Under normal circumstances, the microflora is in balance with the environment of the pore and does not cause any problems. However, various factors can tip the balance and cause bacteria to grow excessively. This triggers inflammatory response leading the acne lesions. *Propionibacterium acnes* (*P. acnes*) is the species of bacteria most commonly associated with acne. However, other species may have a role as well. The factors contributing to the overgrowth of *P. acnes* include, excess sebum, accumulation of dead cell plugging the pore, suppression of immune system and others. Some people become allergic to *P. acnes* and may develop inflammatory acne lesions even when bacterial overgrowth is minimal.

- **Skin irritation:** Skin irritation does not generally cause acne by itself, but may induce a flare-up or exacerbate existing lesions.

- **Drugs, pollutants:** Certain drugs and environmental pollutants have been linked to acne with varying degree of certainty. Some examples include anabolic steroids, lithium, and barbiturates. Exposure to high levels of chlorine compounds, such as chlorinated dioxins, can cause severe, long-lasting acne, known as Chloracne.

**Pathogenesis.** As a result of genetic and hormonal factors there is an increase of quantity of sebum. In a norm it contains the saturated and unsaturated fatty acids. At a hypersecretion a sebum is formed mainly due to the accessible endogenous saturated fats and there is a relative deficit of the unsaturated fatty (exogenous essential f.a.) acids, that hampers evacuation of sebum from an oil-gland. Thus the most essential moment of pathogeny of acne is a lack of linolic acid, so the follicle hyperkeratinization and disorder of structure and function of epidermal barrier are started. Also there is an increase of pH of sebum, that in same queue results in development of dysbacteriosis of skin, when a saprophyte acid-proof flora (in a norm a sebum has subacid pH) is ousted other micro-organisms (epidermal staphylococcus, oval pityrosporom, addition of pathogenic flora is possible). As a result of foregoing factors there are a follicle hyperkeratinization and hypertrophy of oil-glands, comedones are formed, anaerobic terms are created in a gap-filling fat gland. It is known that opportunistic *Propionibacterium acnes* are optional anaerobes and feed on glycerin, degraded by the own lipasas from triglycerides of sebum (to glycerin and free fatty acids). Thus, ideal terms are formed for *P. acne* activating. As a result of activity of *P. acne* free fatty acids (in particular arachidonic acid, which are the source of proinflammatory prostaglandins and cause inflammation in oil-gland and surrounding fabric) eventual stage of development of acne appear.

The deficit of linolic and linolenic acids are aggravated by this inflammatory action, because linolenic acid is the source of anti-inflammatory prostaglandins and linolic acid is a predecessor of  $\gamma$ -linolenic acid which works as a 5- $\alpha$ -reductase bloker and can repress the secretion of oil-gland.

### **Classification.**

1. Juvenile acne: comedones, papulo-pustular acne, nodish-cystic acne, fulminant acne.
2. Adult acne: late acne, inversion acne, «Bodybuilding acne», acne conglobata, piodermia faciale.
3. Infantile acne: acne of new-born, acne of children.
4. Exogenic acne (cosmetic acne, contact acne).
5. Mechanical acne.
6. Akne-like acne (acne from medicines, acne excoriative, other).

**Clinic.** Acne lesions have several types:

- **Comedone/Microcomedone:** Comedone is enlarged hair follicle plugged with oil and bacteria. This is the first and smallest type of lesion. It is often called microcomedone because it cannot be seen by the naked eye.

- **Open comedone/blackhead:** Open comedone – blackhead is a plugged follicle that reaches the surface of the skin. Although dark in appearance, blackheads do not indicate the presence of dirt. The dark color comes from chemically altered oils and bacteria.

- **Closed comedone/whitehead:** Closed comedone – whitehead is a clogged follicle that stays beneath the skin. Whiteheads usually appear on the skin as round, white bumps 1–2 mm wide.

- **Papules:** Papules are inflamed lesions that appear as small, pink bumps on the skin. They do not contain any visible puss.

- **Pustules/pimples:** Pustules or pimples are inflamed pus-filled lesions red at the base

- **Cysts and nodules:** These are large, inflamed, pus-filled lesions that are lodged deep and can drain, causing pain and scarring.

- **Scars:** As they heal, acne lesions, particularly cysts and nodules and, less frequently, pustules may cause scars of various shape and size.

Localization of elements is disorderly on a face, neck, shoulders, trunk, buttocks. Clinical course is subdivided into the period of exacerbation and period of remission. The period of exacerbation on the degree of severity is divided into light, middle and severe forms. At an light degree comedones, single pustulas and papulaes appear; nodes and scars absent. At a middle degree there is a generous amount opened and closed comedones, papulaes, pustules, nodes; after resolution of which atrophy scars appear, psychoemotional disorders take a place. A severe degree is characterized by presence of enormous amount of comedones, phlegmonous and conglobata acnes. Atrophy and keloid scars

appear after their disappearance. A disease is accompanied with severe psychoemotional disorders. For the period of remission calming down of all of clinical symptoms is characterized: the amount of comedones are diminished, papulae, pustules and nodes disappear, abandoning after itself a proof polychromia and atrophy or keloid scars. At early remission can remain comedones, post-inflammatory polychromia, phenomena of postacne. In this period there is disbacteriosis of skin and its dehydration atrophy scars left. Late remission is characterized damage of relief of skin, forming of scars.

*Acne fulminans* is a rare and severe form of acne for youths 13-18 years, suffering the light form of disease. Characterized an outbreak, by the increase of temperature to 38 °C, general intoxication, arthralgias, myalgias, abdominal pains. On the skin of the back, breast, lateral surfaces of neck and shoulders ulcero-necrotic elements appear. On face the lesions not present.

*Acne of adults.* Late acne of women arise up regularly 2–7 days prior to menstruation, appear in area of chin and underparts of face. Represented by papulas, pustules and nodes, that are related with maximal activity of yellow body in this period. This type of acne badly respond to treatment. Sometimes such women suffer hirsutism or polycystic ovary.

*Acne conglobata* is a severe form of abscessing acne with the primary damages the trunk, presented the conglomerates nodes, abscesses, cysts. These acnes appear on a background thickening of sebum, difficulties of evacuation from oil-glands, that on a background a concrete oily seborrhea. The pressed scars stay after their resolution. It can be the manifestation of karyotype of XYY (tall men, with the easy mental deficiency and aggressive behavior).

Phlegmonous-necrotizing acne arise up at decline of reactivity of organism and absence of due treatment. There is the suppurative inflammation of tissue and formation of plural atheromas.

Acne-keloid arises up on a background low reactivity at protractedly existent inflammation and at presence of autoimmunologic reactions. Scarring of deep elements takes a place with forming of keloid scars.

*Inversion acne* is related to the second damaging of apocrine glands. Localization is characterized: axillary cavity, inguinal folds, umbilical region, areola of nipples. Begin as usual acnes, sweat-glands are engaged in a process the secondary, after the period of pubescence. Quite often this disease combines with the severe forms of acne, and also with enhanceable mass of body. Begun with sickly infiltrates, which are unsealed, forming the fistulas.

*Bodybuilding acne.* This form of acne is related to the using of anabolic steroids (mussles pills). Quite often such forms of acne arise up in a few weeks after the prescribing of androgens. Principal reason – hyperandrogenism cause the hyperproduction of sebum. An analogical effect is caused by glucocorticoides, vitamins of B group.

*Infantile acne.* Acne of new-born related to the phenomena of hormonal crisis or surplus products of testosterone in an intrauterine period. Lesions are presented closed comedones on cheeks, forehead, chin, papular and pustular elements which are settled independently and does not require treatment appear sometimes.

Acnes of children arise up on 3–6 month, can make progress, sometimes cause severe lesions, existing by years. A disease can be related to innate hyperplasia of adrenal glands or androgens producing tumour.

To **postacne** belongs: expansion of pores, rough texture of skin, scars, stagnant spots, post-inflammatory hyper- and depigmentations, persistent erythema and expansion of capillaries in the places of protractedly existent inflammation and permanent traumatising (wings of nose, chin, cheek-bones). The intensity of postacne always correlates with severity of acne. Age of patient and duration of exacerbation play an impotent role.

### **Cosmetic facilities and methods of treatment of acne**

1. **Consultation** of dermatologist, gynaecologist, endocrinology, other specialists. At compiling of the cosmetic correction acne program it is necessary to take into account medicinal treatment. Pharmaceutical oral treatment of acne includes antibiotics (tetracyclines, macrolides and oth.), hormonal treatment (COC, oestrogens, antiandrogens), retinoids (isotretinoin), topical treatment - applications of emulsions, gels and lotions with antibiotics, retinoids, azelaic acid, benzoil peroxide, zinc hyaluronate, zinc acetate.

2. **Individual cosmetic care.** Anti-acne cosmetics solves the next problems. It eliminates follicular hyperkeratosis, takeseboregulating, anti-inflammatory, antiseptic effects and protects regeneration of skin and postacne prevention. *Keratolytic substances.* The AHA and them ethers, BHA (salicylic acid), retinoids (retinoic acid, retinal, retinol), azelaic acid are used more frequency. The thistle is used as a mechanical keratolytic substance for preparing a masks.

*Seboregulators.* They have an comedolytic and anti-inflammatory influence upon the acne. The derivates of vitamin A, 18- $\beta$ -glycyrrhetic acid with zinc, блокаторы 5- $\alpha$  reductase blockers, such as cabbage palmetto extract, phytoestrogens, green tea catechines, zinc,  $\gamma$ -linolenic acid, oleanolic acid affect by this way. Some plant extracts take such effect. Seboregulating effect exert extracts of burdock, white cabbage, cedar, fir, horse-radish, poplar, cornflower, veronica, horse-tail, rosemary, gypsywort, nettle, algae, root liquorice, green tea. *Regenerating substances* are pantenol, bisabolol and allantoin. Plant extracts, which have a regenerating capacities are calendula, burdock, lucerne, ivy, mango, papaya, passion-flower, rest-harrow, algae, periwinkle, St.-John's wort, garden violet. It is necessary to use epidermal barrier restructuring substances, such as primrose oil, common borage oil, black-currant oil, lecithin. As a *antiseptic substances* anti-acne cosmetics are used

miramistine, triclosan, organic sulfur, extracts of calendula, camomile, burdock, white cabbage, cedar, fir, elder, poplar, rosemary, laminaria, nettle, cowberry, grapefruit, green tea, kiwi, orange, papaya, passion-flower, five-finger, peach, pineapple, lemon, thyme, bergenia, mint, acerose leaf, cinchona, algae, juniper, ragged pink, persicaria. Some essential oils have antiseptic properties – manuka oil, clove oil, limon oil, bergamot oil. However they can irritate of skin. The extracts of poplar, aloe, apple, arnica, periwinkle, avocado, black-currant, cowberries, camomile, althaea, orange-tree, elder-berry, grapefruit, kiwi, sage, bergenia, witch-hazel, dried lime-blossoms, native lime, guarana, calendula, mistletoe, peach-tree, manuka, papaya, hibiscus, wormwood, passion-flower, milfoil, pineapple, primrose, pinkare used as a *antiinflammatory substances*. Zinc hyaluronate influences on skin like one's. Silicon, aluminium silicate, calcium, polymeric granules and clay are used in anti-acne cosmetic as a *grease sorbent*. *Essential oils* for anti-acne cosmetic are eucalyptus oil, tea tree oil, sandalwood oil, attar of roses, camomile oil, rosemary oil, patchouli oil, mint oil, uniper berry oil, melissa oil, manuka oil, lavender oil, cypress oil, cedarwood oil, grapefruit oil, bergamot, bitter orange oil. The *rehydrants* nonanimal origin are included to anti-acne formulations also.

**3. Manual methods.** In the period of clinic intensifying eliminate all of hot procedures, cosmetic cleanings, massages, chemical peels, visits to solarium. The use of masks is possible. Appoint masks from medical peloids, absorbing, resolving, antiseptic, antiinflammatory. In the period of remission recommended the cosmetic cleanings, massage after Jacques, massage on the ozonized oil, cryomassage, phytopeel, enzymatic peel, chemical peel, paraffinotherapy. At an easy degree of acne recommended gommage, superficial chemical peels AHA, BHA, retinoids. At most evidenced postacne medium chemical peel (TCA) recommended, except a swarthy skin.

**4. Apparatus methods.** In the period of intensifying all of hot procedures and methods, damaging an epidermal barrier are eliminated (dermabrasion, aporization, IR-lamp, laser vaporize and other). The use of d'arsonvalization (cauterizing method at single pustulas) is possible, chromotherapy, electro-coagulations of single infiltrates. Vaporisation recommend in the period of remission, as a desincrustation, vacuum cleaning, iontophoresis antiacne and resolving facilities, infra-red irradiation of postacne infiltrates, ultraphonophoresis, ultrasonic peel, microcurrent therapy, galvanization of area of postacne scars, chromotherapy (green, yellow colors), microdermabrasion.

*Phototherapy.* Some forms of visible light, in particular intense blue light, have been shown to reduce the number of acne lesions by 50 percent or more. It appears to work by interacting with porphyrins, a class of chemicals produces by acne-causing bacteria *P. acnes*. This interaction results in the production of noxious free radicals that are toxic to bacteria. The side effects of such treatment,

if any, are generally mild because porphyrins are not present in skin cells and so the damage they produce is limited mainly to the bacteria. It appears that a combination of red and blue light is even more effective than the blue light alone. Good results are obtained with at least 2 treatments a week while daily treatments seem to be the most effective. Anywhere from one to three months of treatments are generally required to achieve substantial improvement. When treatment is discontinued, the improvement lasts longer than after benzoyl peroxide or antibiotics (up to several months). The main downside is the need for repeated office visits for treatments or, for home use, considerable cost of the equipment. Light sources used in PDT include laser or nonlaser light.

*Photodynamic therapy.* Another variation of the light-based therapy being explored is combining intense blue light with a photosensitizing agent, such as delta-aminolevulinic acid (ALA), which increases the production of porphyrins.

5. **Injection methods.** Ozonotherapy applied at the infiltrated forms of acne, ионикотерапию is hypodermic or endermic injections of ionized oxygen. Subdermic chipping, irrigation with ozonized distilled water, intravenous infusion of ozonized physiologic saline, or external gassing used at comedones, postacne. In the period of remission injections of facial implants (collagen, hyaluronic acid) are possible for smoothing of relief of skin.

6. **Dermatological methods** are a standard dermabrasion, laser vaporization for smoothing of relief of skin in a period postacne.

## **HAIR DISEASES. ALOPECIA. HIRSUTISM. HYPERTRICHOSIS. DYSTROPHY OF HAIR. HYPERKERATOSIS OF SCALP**

### **Alopecias: determination, classification.**

**Alopecia** is a pathological falling out of hair. Distinguish a cicatricial alopecias, conditioned destruction and sclerosis of hair follicles because of inflammation, atrophy of skin or scarring, and uncicatricial alopecias, coursing without the preceding affecting of skin. To the uncicatricial alopecias take a alopecia areata, androgenetic alopecia, diffuse alopecia.

**Alopecia areata (alopecia circumscripta)** pathological hair loss, conditioned the different affecting hair follicle and clinically showing up forming of focuses complete absence of hairs on hairy part of head, area of beard, eyebrows, cilia and trunk. Alopecia areata (AA) can occur at any age, including in childhood.

### **Select 5 types of alopecia areata.**

An ordinary type is characterized beginning in age 20–40 years. Focuses forms prevail in a clinical course. The cases of self-recovery are possible.

A prehypertensive type arises up for young people at which high blood pressure develops with the lapse. Sometimes the parents of patient suffer on severe forms of early arising up high blood pressure.



An atopic type occurred at combination of alopecia areata with the atopia. Such form of alopecia is difficultly sanable. A total and universal alopecia develops often.

Autoimmune type characterized by combination of alopecia areata with autoimmune diseases.

Mixed type arises up for people more senior 40 years, characterized torpid course with less frequency of development of subtotal and total forms.

**Etiology.** In development of alopecia areata genetic determined plays an important role. As a pathogenetic factor the deficit of zinc, psychical stress, disfunction of GIT, trophic disorders, some infections (toxoplasmosis, cytomegalovirus, campilobacteriosis), endocrine disorders, are also examined. Alopecia areata is considered to be one of the autoimmune disorders – lymphocytes around the hair follicles release chemical messengers (called cytokines) that reject the hair for unknown reasons. Alopecia areata may occur in more than one member of the family, and such families may develop other autoimmune diseases such as pernicious anaemia and vitiligo. It is also more common in patients with chromosomal disorders such as Down syndrome. Like many other health problems, it sometimes starts after a stressful event. Alopecia areata itself may be emotionally very distressing.

**Clinic and diagnosis.** On a background a complete health, the rounded or oval focuses absent of hair appear without subjective signs (sometimes pricking in area of hearth). In hairless areas skin drawn-in (hollow) and has the colour of “elephant ivory”, sometimes with the signs of inflammation. Atrophy absents. The mouths of hair follicles are saved. Alopecia areata is often discovered by a hairdresser, as there are usually no symptoms. The hair stops growing and then falls out from the roots. Alopecia areata has three stages. First there is sudden loss of hair, then enlargement of the patches of hair loss. Lastly new hair grows back, often initially coloured white or grey. It may take months and sometimes years to regrow all the hair. One patch can be falling out while another is regrowing.

Select **6 clinical forms** of alopecia areata: local, linearis (ophiasis), subtotal, total, universal, with the affecting of nails.

A local form is characterized the isolated rounded form focuses of alopecia with the practically unchanged skin in place of focuse.

A linearis form shows up the focuses, which is begun with the skin of the back of head, gradually spreads as a tape to the auricles or temples. This type of alopecia feels spreadsto the another parts of skin and is prognostically unfavorable.

A subtotal form is characterized the extensive focuses of affecting, appearing as a result of confluence of more fine focuses.

At a total form hairs absent on all of surface of head, including cilia, eyebrows, for men – beard.

At an universal alopecia areata hairs absent on all of surface of skin.

Alopecia areata with the affecting of nails is characterized point impressions on a nail plate, longitudinal triated, onychorrhexis, by undulating nails. Sometimes nails have signs of micronychia.

Severe alopecia areata selected in **4 degrees**:

1 – are single focuses of affecting a size 3–5 sm in a diameter

2 – focuses of affecting a size 5–10 sm in a diameter

3 – ubtotal alopecia

4 – total and universal alopecia

There are other criteria of severe degree which is determined the area of affected hairy part of head: to 25 % – slight 25–50 % – medium, over 50 % – severe. It should be remembered that hairs are apt at renewal even after many years of disease. Treating is necessary not only hearth but also all of surface of head. It is not necessary to expect a result before, what in 3 months.

**Cosmetic facilities and methods of treatment of hearth defluxion.**

1. **Consultation** of trichogist, dermatologist, psychoneurologist and other.

2. **System correction.** Glucocorticoides, immunodepressants (only on the recipe of doctor), and also special complexes of vitamins, oligoelments (zinc, biotin and oth.) and aminoacid for stimulation of growth of hairs. Injecting a cortisone medicine into the area of hair loss may speed up the natural regrowth of hair. This treatment is known as an ‘intralesional steroid injection’. The regrowth occurs only in the area that has been injected. There is no way of preventing new areas of hair loss. Many other treatments have been introduced for alopecia areata, but the results are variable – no one has yet devised anything that works for everyone. Some lotions applied to the scalp do seem to result in temporary improvement in some people, but the hair falls out again as soon as they are stopped. Medicines which are often tried include topical steroids and minoxidil, and irritants such as dithranol. The most successful treatment to date has been immunotherapy. Immunotherapy works by provoking a contact allergic dermatitis in affected areas by applying a low concentration of a material to which the patient has been made allergic. This is most often diphenylcyclopropenone (diphencyprone). Unfortunately the resultant dermatitis is irritating and may be unsightly, often accompanied by a swollen lymph gland. Therapists and others in contact with the diphencyprone can also develop

3. **Individual cosmetic care.** Recommend cosmetics which containe biostimulators (factors of growth, neuropeptides, stem cell preparations, extract of placenta and other), vitamins and oligoelementss (vitamin of E, groups B, C and other). The irritants phytopreparations marginally improve the microcirculation (arnica, mustard, nettle, red pepper, onion, garlic). The plants biostimulants are extractes of ginseng, watercress, bay willow. The essential oils for alopecia are cedarwood oil, rosemary oil, camomile oil, sandalwood oil, thyme oil, tea tree oil. If autoimmunic nature of alopecia is provedit is nessesery to eliminate immunostimulators, stimulators of microcirculation, irritants.

4. **Manual methods:** massage of hairy part of head, massage with topical medicines and cosmetics, butters, paraffin appliques, cryomassage, mask with freshwater sponge. In the case of the expressed autoimmunologic component methods increasing the influx of blood to the hair follicles are contra-indicated.

5. **Apparatus methods:** galvanization, iontophoresis (glutamic acid, ascorbic acid, nicotine acid, aminophylline, sulfate of zinc), d'arsonvalization by a scalloping electrode, photoradiotherapy by therapeutic helium-neon laser, IR irradiation, microcurrent therapy. In the case of the expressed autoimmunologic component apparatus methods are contra-indicated.

6. **Injection methods:** mesotherapy, ozonotherapy (hypodermic injection of oxygen-ozone gas mixture directly to the focus of alopecia).

7. **Surgical methods:** transplantation of hairs, operation on scalp reduction.

8. **Camouflaging:** tattoo, hairpiece, wig.

#### **Androgenetic alopecia.**

*Androgenetic alopecia (balding)* is a making progress pelade, caused influence of androgens on hair follicles and arising up for people with the inherited predisposition. A disease begins in any age after completion of pubertal period, more frequent after 40–50 years. Men suffer considerably more frequent. For women a disease begins after 50–60 years. Inheritance for men – polygenic or autosomal- dominant, for women – autosomal-recession.

**Etiopathogenesis.** Male pattern hair loss is an inherited condition, caused by a genetically determined sensitivity to the effects of dihydrotestosterone, or DHT. DHT is found in several tissues in the body including the scalp. DHT is believed to shorten the growth, or anagen, phase of the hair cycle, causing miniaturisation of the follicles, and producing progressively finer hairs. The production of DHT is regulated by an enzyme called 5- $\alpha$  reductase. All hair follicles are replaced at different rates by the normal process of hair cycling. Hair growth alternates between phases of activity and rest. The growth period, called the anagen phase, lasts for two to six years. During this time, the follicle is long and deep, and produces thick, well-pigmented hair. About 90 % of all scalp hairs are in the anagen phase at a given time. Anagen is followed by a brief transition known as the catagen phase, which lasts a few weeks. During this time, the base of the follicle shrivels. The resting period, or telogen phase, lasts for two to four months. In this phase, the follicle withers even further. Following the telogen phase, the next anagen phase begins, and the old hair is dislodged and falls out to make room for a new hair to begin growing in its place. Male pattern hair loss occurs in men who are genetically predisposed to be more sensitive to the effects of DHT.

**Clinic.** In the focuses of alopecia at the persons of both sexes there is a gradual substitution of long hairs on thin, short, nonpigmented, in course of

time substituted for them vellus, then disappear fully. On affected areas a skin is smooth and shiny, the orifices of hair follicles are not visible. A androgenetic alopecia is often accompanied with oil seborrhea and seborrheic dermatitis of hairy part of head.

For men a AA begins in a frontal and parietal area. Substituting for long hairs does not take temporal and cervical areas even in the most expressed cases and in a senium. At a severe stage of AA growth of beard, and also hair in the axillary cavity, on pubis and on a breast are often increased.

Select 5 stages of disease:

1 stage is a alopecia along the front border of hair part of head

2 the stage is formation of bilateral high temples on a forehead and thinning out of hairs on top of the head

3, 4, 5 stages is a making progress alopecia focuses on a forehead, sinciputs, confluence of them, that ends with the complete symmetric alopecia of parietofrontal area.

Androgenetic alopecia for women is begun with a parietofrontal area. Select the followings stages of womens AA:

0 the stage is normal hairs

1 stage is the beginning thinning out of hairs in a parietal area. A frontal strip breadthways 1–3 sm remains unchanging

2 the stage – obviously thinning out of hairs in a parietal area

3 the stage is the expressed thinning out of hairs on the wide areas of frontoparietal area; the hairs of frontal part remain unchanging.

In addition, the increasing narrowing of stem hair and seborrhea is registered.

Diagnostics of AA is based on information of anamnesis, clinical picture, consultations of endocrinology, gynaecologist. At conversation with a patient a slowly making progress of disease without patches, making progress thinning of hairs, surplus growth of hairs on face and trunk, acne and oil seborrhea even in mature age.

### **Treatment and cosmetic correction**

1. **Consultation** of dermatologist, trichologist, endocrinology, gynaecologist, andrologist

2. **System correction.** Antiandrogenic therapy is appointed only a doctor. For men possibly using of oral 5- $\alpha$  reductase bloklers (an extract of a palmetto, some phytoestrogens, zincand other), antiandrogens (Finasteride, cyproterone acetate). Antiandrogens (cyproterone acetate, spironolactone), preparations of estrogens, are recommended women. Topical treatment – monoxidyl.

3. **Individual cosmetic care** with the use of cosmetic facilities (lotions, shampoos), containing 5- $\alpha$  reductase bloklers (zinc, vitamin B6, extract of palm palmetto, polyunsaturated fatty acids:  $\gamma$ -linolenic, docosohexaenic, arahidonic,

$\alpha$ -linolenic, linolic, which are contained in oil of blackberry, borago a, avocado, hohoba, primroses evening), phytoextracts isoflavones of extracts of red clover, soy, alfalfa, hop, seed and skin of vine, verbena, wild yam, st-john's-wort, clary, nettle, and other, phyosterols of oil of embryos of wheat, olive, sesame, palm and copra). The copper-bearing peptides (SRCPs). The copper is an effective blocker of 5- $\alpha$  reductase, especially 1 type, so using copper-bearing peptides are perspective for a androgenetic alopecia. The most important vitamins and trace elements for alopecia are vitamins B group, E, A, retinoids, sulfur, silicon, methionine, biotin. The minoxidil and aminexil have an vasorelaxant action, prolong the anagen phase, revive sleeper follicles.

4. **Manual methods:** does not recommend, as all of them are directed on the improvement of circulation of blood, that strengthens delivery of androgens to the hair follicle. Possibly, use of cosmetics in combination with the easy massage of hairy part of head, pack.

5. **Apparatus methods:** rotined only after transplantation of hairs and normalization of hormonal background, otherwise the influx of blood only will strengthen delivery of androgens to the hair follicle chromotherapy is recommended, microcurrents d'arsonvalization.

6. **Surgical:** self-grafting of own hairs from back-lateral areas to the top of the head area, temples and forehead. Transplantation of grafts (2–4 hair follicle) is made by a microscopic and laser technique. Heterotrasplantation of – transplantation of artificial hairs by the method, when in a tiny cut a hair implanted with a loop on an end, which is straightened in the deep layers of skin and germinates connecting tissues. A well-formed microscar retain hair in a skin.

#### 7. **Techniques of of scalp redusing.**

8. **Camouflaging methods:** carrying of hairpiece, wigs, tatoo.

**Diffuse alopecia.** A diffuse alopecia includes telogenic (symptomatic) and anagenic (toxic). Anagenic alopecia arise up in exceptional cases. Clinically characterized alopecia on all of hairy part of head at the background of normal skin. Telogenic alopecia is characterized the enhanceable amount of telogenic hairs in trichogramma. Observed at physical and emotional stress through 3–4 or 5–6 months after. Different factors cause the sudden stunt of growth of hair follicles which owe were is in the phase of growth, but pass to the toxico-metabolic (symptomatic) telogenic alopecias. A symptomatic diffuse alopecia is the result of endogenous or exogenous damage of anagenic hair follicles. They in most cases reversible, although can course chronically. Caused hematogenous. The degree of thinning out of hairs depends on duration and intensity of initiating agent.

Physiological telogenic alopecia.

*Alopecia at new-born.* For fetus all of hair follicles are in the phase of anagen. From the moment of birth they synchronously enter into the phase of telogen. After incessant alopecia starts in 6–8 weeks.

A postnatal alopecia is a telogenic alopecia which comes after 2–4 months after births. During pregnancy 95 % hair follicles are in the stage of anagen, and after pregnancy synchronously enter into the phase of telogen. Approximately from a 8-th week a diffuse alopecia comes after births, but over the state is normalized the months. The similar phenomenon is after withdrawal of hormonal contraceptives, which create in an organism a hormonal background, similar to the state during pregnancy.

*A postpubertal alopecia* arises up young girls in age 16–20 years and sometimes considered the initial stage of androgenetic alopecia, related to beginning of production of androgens. Hairs arrive at the maximal density and thickness in the period of pubescence, the physiological process of senescence, which slowly conduces to thinning out and thinning of hairs, begins whereupon.

Premature or presenile alopecia. Because of making progress atrophy of hair follicles hairs in a sear and senile become all rarer and thinner. Hairs fall out gradually, in the beginning in parietal and frontal areas. In time focuses are increased and hairs remain only at the regional area of hair cover.

Alopecia after transplantation of follicles. The again displanted follicles test stress and halt growth. They can fall out in 3 months. However after brief rest hair follicles again will begin to product new hairs.

*Toxic and metabolic telogenic alopecia.* Hair follicles in an anagenic phase have high metabolic activity. Metabolic and different disturbances toxic influences can at once influence on efficiency of synthesis and cause premature completion of anagenic phase. Such processes can be episodic (diseases with a fever) and chronic (siderotic anemia, insufficient feed). The most frequent reasons of episodic telogenic alopecia are an abundant loss of blood, high temperature, acute severe infectious diseases, operating or traumatic shock, attacks of system diseases, forced diets, some medicines.

A diffuse alopecia at infections is observed after a flu, malaria, infectious mononucleosis, pneumonia, brucellosis, typhoid, tuberculosis, syphilis. A defluxion comes after 2–2.5 month after the heavy attack of fever.

Medicine-induced or caused chemical toxins diffuse alopecia arises up at the reception of alkaloids of ergot, anticoagulants, antiparkinsonian facilities, beta blockers, blockers of H<sub>2</sub>-receptors, inhibitors of APF, normotonic facilities, colchicine, contraceptive, anticonvulsant facilities, retinoids.

Diffuse alopecia at chronic diseases. Meets at endocrine diseases: hyperthyroidism, hypothyroidism (affect of eyebrows, analogical a syphilitic defluxion and defluxion at atopic dermatitis, is a sign of Khertoge). The followings diseases can cause a chronic diffuse psilosis: erythrosis, psoriasis, hepatitis, Besnier-Boeck-Schaumann, dermatomyositis, syndrome of myalgia with an eosinophilia, lupus erythematodes, encephalitis, malignant neoplasia (leukemia), HIV-infection.

A psychosomatic defluxion is a sharp or chronic psilosis which is observed after the strong emotional loadings and stresses. Observed during wars, at accidents, after operative interferences.

Idiopathic chronic diffuse defluxion. Such diagnosis is put at the unexposure of reasons of alopecia.

For raising of diagnosis information of anamnesis and examination is important: in determination of exact date began difficulty of patient psilosiss, there are not signs of thinning or weakness of hairs, there are not displays of acne or hirsutism, great number of psychological problems or recent shocks.

#### **Treatment and cosmetic correction of telogenic alopecia**

1. **Consultation** of dermatologist, trichologist, psychoneurologist and other  
2. **System correction:** oral complexes for strengthening of hairs and nails, containing proteins, vitamins, oligoelementss.

3. **Individual cosmetic care:** cosmetic facilities (shampoos, lotions, balm, masks), containing boistimulators, nourishing and strengthening facilities.

4. **Manual methods:** massage of hairy part of head, massage on hairgrowing cosmetics (lotions, oils), appliques of professional cosmetics, packs (in combination with thermal procedures), cryomassage, SPA-therapy.

5. **Apparatus methods:** d'arsonvalization, chromotherapy, magnetic-laser therapy, microcurrents, galvanization and iontophoresis, vaporization, vibratory massage.

6. Injection methods: mesotherapy

#### ***Pathology, related to surplus hairiness.***

**Hirsutism** is growth of long hairs for women partly or fully on a masculine type, that in androgendependent areas are lips, chin, breast, stomach, thighs. More frequent than all registered at Caucasian nationalities.

**Etiopathogenesis.** Hirsutism is conditioned the excessive products of androgens or diminishing of amount of estrogens in an organism. An important factor is correlation of testosterone\oestrogen. Estrogens influence on forming f globulin in the liver, relating free testosterone, and also products of metabolism of dehydrotestosterone. Induction of hair growth by androgens takes a place at intracellular transformation of testosterone under influence 5- $\alpha$ -reductase to dehydrotestosterone, utilization last takes a place in the genetically predispositioned cells of hair follicles. Hereupon there is a regeneration of thin vellus hairs in thick, strongly pigmented.

#### ***Classification.***

1. Hormonal hirsutism (at surplus of androgens) caused by polycystic ovary, tumours of ovaries, tumours of adrenal glands, hyperplasia of adrenal glands, Itsenko-Cushing syndrome, hyperprolactinemia, syndrome of insulin resistans, acromegalia. Hirsutizm at the syndrome of polycystic ovary is inherited autosomal - dominant. Thus hirsutism begins to show up in a pubertal

period and makes progress slowly. Besides it there are other manifestation of hyperandrogenia are oil seborrhea, acne, androgenetic alopecia.

2. Paratherapeutic (on a background the reception of medicines) – antiepileptic, danazol, preparations for endometriosis and breast tumors, contraceptives, L-thyroxin, corticosteroids, androgens, ACTH and other

3. A idiopathic (without visible reasons) – hormonal background is in a norm, did not accept medicines. Often arises up after psychic emotional shock. Possibly, idiopathic hirsutism steroidogenetic violations are underlaid.

**Clinic.** On an overhead lip, chin, in area of nipples, there is enhanceable hairiness of different volume on forearm and shins. Often there is a change of hairiness in area of pubis on a masculine type – from the white line of stomach to the umbilicus. Combination with violations of menstrual cycle is possible, androgenetic alopecia, acne. Except for excessive hairiness quite often for women can show up other masculine lines are deep voice, masculine gait, diminishing of mammary glands, violation or stopping of menstruations, sterility. It is needed to remember that hirsutism can be the sign of of ovaries diseases, CNS diseases (tumour of brain, encephalitis, disseminated sclerosis), tumour of ovaries, tumour of adrenal glands, hypophysis, violation of development of ovaries, illness of liver and other.

#### **Cosmetic correction and treatment of hirsutism**

Consultation *of endocrinology, gynaecologist, internist, dermatologist.*

Blood tests may be arranged to evaluate male hormone levels, which could be due to a tumour or overactivity of the pituitary gland, the adrenal gland or the ovary. Other causes of excessive hair and associated medical problems may also need to be evaluated. The tests may include one or more of the following:

- Total and free testosterone
- Sex hormone binding globulin
- Free androgen index
- Dihydroxyepiandrosterone sulfate
- Androstenedione (drawn after 10 a.m.)

If there is also menstrual disorder, additional tests may be requested.

- Luteinizing hormone (LH) and follicle stimulating hormone (FSH)
- Oestradiol, 17-hydroxy progesterone
- Prolactin

Tests may be requested to evaluate other related aspects of health, for example:

- Thyroid function
- Cortisol or overnight dexamethasone test
- Glucose
- Lipids (cholesterol and triglyceride)

**Antiandrogenic therapy** – antiandrogens, oestrogens, COC.



**Manual methods:** Depilation (waxing, sugaring), delete pincers.

**Apparatus methods.**

**An electro-epilation** is destruction of hair follicle by an electric current. An electric current is given through a thin needle, which, getting to the hair follicle, causes the row of chemical and physical reactions which a hair papilla perishes as a result of. A current can be direct and alternating. Needles are made out of stainless steel, platinum, silver, with a gold cover, large popularity is used by needles with teflon coverage, at which only the tag of needle remains free, that eliminates the risk of appearance of scars on a skin. On this principle three methods are based: thermolysis, electrolysis, blend, flesh, sequential. Thermolysis the thermal affecting is underlaid follicle, at his treatment a high-frequency alternating current. A high temperature results in coagulation of organic fabric of follicle of hair, being in the stage of anagen. At an electrolysis a hair follicle is processed a direct electric current. He causes in fabrics the process of breaking up of water with formation of lye which destroys a follicle. Blend-method is based on combination of thermolysis and electrolysis, that lye, arising up at an electrolysis, is yet and heated. On separate operations this method loses thermolysis and electrolysis in time, however abbreviated general duration of epilation is due to high efficiency. Flesh is characterized an alternating current, but depending on the thickness of hair the impulses of different duration and amplitude are utilized. Short impulses allow to decrease the pain feelings, in spite of large strength of current. Sequential is a variant of blend method, but amplitude of direct-current goes down, when high-frequency impulses pass. This is arrive at an insignificant sickliness at high efficiency. For the decline of sickliness apply infiltration or explorer anaesthesia (novocaine, lidocaine), ointment of Emla.

Laser epilation, photoepilation, biothermodepilation are used too.

It is necessary to remember that hirsutism is contra-indication for massage, paraffin, freshwater sponge masks, d'arsonvalization, brossage and other natively-irritating and hyperemic procedures.

**A hypertrichosis** is surplus growth hair, not proper the area of skin, aging and sex of patient. Distinguish an innate, acquired and paratherapeutic hypertrichosis.

**Innate hypertrichosis.**

**An innate vellus hypertrichosis** is inherited autosomal-dominant. During all of life hair follicles save ability to form vellus hairs only. Presented a hypertrichosis with thin, discoloured intrauterine hairs without a crust matter, which can be disposed on all of surface of skin.

**Hypertrichosis innate limited** – meets as separate nevus follicle anomaly, characterized growth of long, hard, pigmented hairs sometimes without the skin lesions, but more frequent on pigmented nevi. Varieties are pigmental

pilose nevus (differs the presence of rough hairs), nevoid hypertrichosis (regions of growth of long hairs without skin changes), Becker nevus (mainly for men the region of brown color feels like centrifugal growth, a hypertrichosis in affected areas appears only after puberty).

**A lumbosacral hypertrichosis** accompanies the anomaly of development of distal part of spine and spinal cord. Shows up the presence of bunch of long pigmented hairs, growings from a healthy skin above the area of bone defect (area of loin, breast, neck).

**Symptomatic hypertrichosis** concomitant the row of innate diseases (erythropoietic porphyria, gingival fibromatosis and other).

**Aquired hypertrichosis.** Symptomatic – at skin porphyria, hypothyroidism, acromegalia, diabetes, dermatomyositis and other.

**Aquired vellus hypertrichosis** as paraneoplastic disease – at the malignant diseases of bronchial tubes, intestine, gall-bladder and other there is a rapid substitution of all of types of hairs on all of surface of body long, thin, light hairs. Thus speed of growth of such hairs arrives at 2.5 sm in a week, exceeding normal in 10 times. At an exposure urgent consultation of oncologist is obligatory. Traumatic - at the traumas of head, viral encephalitis, after the carried traumatic shock. Ahypertrichosis is neurological – one of displays of pathology of peripheral nerves, quite often accompanied local hyperhidrosis. Paratherapeutic and iatrogenic hypertrichosis. In the places of the protracted inflammation, pressure, repetitive traumas, at the protracted use of unsuitable creams (with a lanolin), after physical therapy procedures or thermal influence (hot-water bottles, paraffin, hot masks, protracted hyperemia). Medicinal: at the protracted application of minoxidyl, streptomycin, corticosteroids, anabolic steroids, D-penicillamina, cyclosporine, psoralen and other. After stopping of reception of medications growth of hairs usually during a year is normalized.

### **Cosmetic facilities and methods of treatment of hypertrichosis**

1. **Consultation** of specialists (endocrinologist, internist, gynaecologist, dermatologist, surgeon, oncologist and other).

2. **Individual cosmetic care:** inhibitors of growth of hairs (gels, lotions), shaving of hairs, home depilation by electric epilators is pulling out of hairs an involute spiral as a result of vibration, home use of depilatories (creams, mouses) with inhibitors of growth of hairs, dissolvent the keratin of hair, enterin the complement of. Eflornithine administered by injection is used to treat African sleeping sickness, a disease caused by protozoa (tiny one-celled animals). However, eflornithine hydrochloride applied topically as a cream is the first agent known to help slow the rate of excessive hair growth. It is marketed under the brand name Vaniqa® and comes as eflornithine hydrochloride 13.9 % cream. It is currently not available in New Zealand but is available in the United States on prescription from your doctor. **Depilatory creams** are

generally based on thioglycolate (also used in perming solutions). A thick layer is applied for 15-30 minutes to the hairy area, then wiped off and the hair comes off with the cream. Depilatory creams can irritate and cause dermatitis.

**3. Manual methods.** Depilation is a delete of hairs on of short duration time by a mechanical method – by shavings machine-tools, pulling out systems, electric devices, wax, pincers, sugar, bleaching, shaving et cetera.

**Waxing.** Apply artificial and natural waxes, sugar, both in a clean kind and in different combinations. Distinguish the hot, cold and warm methods of depilation. A wax is inflicted on motion growth of hair, retires against growth of hairs. At a hot method a wax is heated to the liquid state, inflicted a skim on a skin to consolidation, tape is taken off hands. A method is used on face and skin with thick, hard hairs. A warm wax does not grow into hard tape, it is therefore impossible to take off him hands. It is done by a cotton serviette or special tapes. What the thinner inflicted layer of wax, that less painfull will be procedure. Used at a normal hair cover, on feet. A cold wax at a room temperature looks like thick honey. He is inflicted on cotton strips. Used only on places with tender, thin hairsprings. Before depilation apply oil removing preparations, after – creams, gels, oils and lotions with an antiseptic and sedative action. The special facilities for deceleration of growth of hairs apply directly after procedure, and then 8-10 days. **Bleaching** makes the excessive hair less obvious. **Shaving** if necessary twice daily, will prevent unsightly stubble. Shaving does not make the hair grow more thickly.

**4. Apparatus methods:** Vibrodepilation is affecting of oscillation vibrations hair follicle, as a result a hair is shaken loose and retires easily. Equity of method is painlessness.

An ultrasonic epilation is introduction by the ultrasound of facilities, oppressive growth of hairs and destroying a hair papilla. Highs is painlessness. Failing is a recurrence of implementation. Variant – ultrasonic aromophytohoresis with the use of hydrolised fibres of jellous transmitters of aromophytoextracts of ginseng, onions, rosemary, melissa, aescin and other. Apparatus introduction of inhibitirs of growth of hairs by phonophoresis or electrophoresis (sulfurabsorbing facilities, aromaphytoextracts).

Enzymatic depilation. On the first stage hairs retire by a wax. Then on the treated area inflict enzyme preparation and contact gel. After it apply an ultrasound, by which enzymes are transported in hair follicles, opened due to waxen depilation. After treatment sedative cream is inflicted. As after depilation a hair channel is opened 2–3 days, conduct enzyme+ultrasound procedure during three days in succession. Parallell enzymatic preparation is used and in home terms, with the subsequent causing of sedative cream. Advantages of method: painlessness, treatment of large areas, short duration, possibility of application for people fair-skinned. Electro-epilation is used too.

**Laser epilation** (for pigmented hairs only), photoepilation (for any hairs).

A light epilation is not conducted at the delete of hairs, growings from nevus.

There are basically 3 types of hair removal methods: temporary hair removal, temporary hair reduction and permanent hair removal. Within each method a number of different techniques are used to achieve hair removal or reduction.

<ul style="list-style-type: none"> <li>• Temporary Hair Removal Techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Temporary Hair Reduction Techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Permanent Hair Removal Techniques</li> </ul>
<ul style="list-style-type: none"> <li>• Shaving</li> <li>• Chemical depilation</li> <li>• Epilation</li> <li>• Plucking</li> <li>• Waxing</li> <li>• Threading</li> <li>• Abrasives</li> <li>• Sugaring</li> </ul>	<ul style="list-style-type: none"> <li>• Eflornithine HCl cream</li> <li>• Laser-assisted</li> <li>• Intense pulsed light sources</li> </ul>	<ul style="list-style-type: none"> <li>• Electrolysis</li> <li>• Galvanic</li> <li>• Thermolysis</li> </ul>

### **Anomalies of hair stem (dystrophy of hairs)**

Structural changes of hair stem usually are the result of the inherited or acquired metabolic violations, and also nonrational cosmetic care. Select dystrophy of hairs, related to enhanceable fragility (monilethrix, twisted hairs, knotted trichoclasia and other) and unconnected with it (syndrome of the uncombed hairs, wooly hairs, trichonodosis and other).

Monilethrix is narrowing of hair stem on a certain segment long to 1 mm, alternating with the fusiform swellings. A disease is inherited autosomal-dominant. At a microscopy a hair reminds a rosary. Hairs are dry, without brilliance, fragile, short (1–1.5 sm), often accompanied a follicle hyperkeratinization. Treatment almost unsuccessfully. Bamboo hairs are autosomal-recession pathology, related to appearance of the alternating fusiform swellings and overtightening, givings a hair a kind rosary. Hairs are dry, without brilliance, broken off easily. Such changes can spontaneously disappear. The twisted hairs are observed exceptionally for girls with light hairs, especially on the back of head. At the microscopy of hairs in middle part incrassate and through uneven intervals fully turned about the axis on 180°. The hairs are curled spirally, look pied from the unevenness of colouring and light-refracting. At lateral illumination on the hearths of defeat hairs glitter, because the reflection of falling rays of light is increased in the twisted places. Clinically find out short chippy hairs mainly in cervical and temporal areas, that results in a pelade. To 8–12 the twisted hairs become almost unnoticeable.

The thinned hairs meet at a seborrhea, hypovitaminosis, chronic infectious diseases, metabolic disturbances. It hairs of ordinary type, but thinner ordinary.

Trichoclasia is innate pathology, related to violation of architectonics of hairs, as a result they can not attain sufficient length and broken off.

Syndrome of the uncombed hairs. The form of cross-sectional of stem of hair at a microscopy reminds a triangle or dumb-bell, there is also a longitudinal ditch on a stem. Hairs are silvery or straw color, stick out higgledy-piggledy, hardly laid in a hair-do.

**Bundle-like hairs** are an extraordinarily rare innate anomaly, developing on the skin of the back of head, back, stomach almost exceptionally for men. The replaced hairs do not fall out, and equally with new hairs remain in a hair follicle. The last overpeer above the level of normal skin as blackish horny corymbs, at the delete of which small bushes or bunches of hairs the number of which reaches to 20–40 are revealed.

**Bayonet hairs** for people meet rarely, thus usually bayonet are only separate hairsprings, growings among quite normal hairs. Reason of their development is unknown; it is possible to suppose that it consists of innately-hyposthenic growth of hair, sometimes because of the mechanical corking of output of follicle. In such hair in the end there is noticeable an eye bulge which is gradually thinned to the free end of hair. Thus, the overhead end of hair reminds by itself a bayonet, why such hairs and got the name.

***Atrogenic dystrophy of hairs.***

**Knotted trichoclasia** is characterized formation swellings, doing hairs fragile on the damaged area as a result of breaking up of the cortex. Examined as a reaction of stem of hair on a damage. Hairs break easily, the snatches of hairs are visible, the expressed defluxion is possible, accompanied dryness of hairs. Reasons: use of thermal procedures (hot rollers, tongs), chemical matters (Perhydrolum, thioglycolic acid).

Trichoclasia combination of slanting crack and breaking up of hair. Reasons those. Trichoschizis (transversal crack of hair) as a result of those reasons.

Ansiform or knot hairs (trichonodosis) are formation on the stem of hair of single or double knots, at tightening of which the fracture of stem appears. Arises up from enhanceable dryness, inefficient care of hairs. Hairs are easily broken off. More frequent meets for women with long hairs.

**Trichoptilsis** (longitudinal breaking up of distal departments of hair) is observed after frequent hairdresser procedures on long hairs. Reason of the cut hairs is fragility of hairs from excessive dryness; sometimes instrumental in breaking up of hairs different mechanical reasons (sharp comb, too hard brush etc.). Trichoptilosis can take a place not only in the stem of growing hair, but can exist and in the roots of hairs simultaneously with atrophy of bulbs.

At the exposure of innate defects of hairs a hairdresser must not execute the requirements of client without consultation and permission of dermatologist of избежание of traumatic defluxion. Other anomalies of hairs.

Trichotillomania – intentional traumatizing hair, which can result in the irreversible changes of follicle and proof thinning out of hairs. Treatment for psychoneurologist.

**Ingrown hairs** are wrong growth of hairs as a result of shaving, traumas of skin, frictions by clothes. Hairs change direction of growth and grow in a skin, causing inflammation. Disturbs an itch, pain. Localization is an area of beard and moustaches for men, area of shins and groin for women. A correction consists in anti-inflammatory outward therapy (gels, creams, ointments) with a subsequent electro-epilation for women, to the men is shaving an electric razor.

**Cosmetic facilities and methods of treatment of dystrophy of hairs**

1. Consultation of trichologist, dermatologist.
2. System correction: reception of albumen-vitamin complexes with oligoelements, hairs intended for renewal.

3. Individual cosmetic care: oily appliques (burdock, jojoba, almond and other), masks for hairs, use of nourishing, regenerating, protective and moistening shampoos, lotions, balms. In the complement of cosmetics different additions enter for the damaged hairs. Conditionings additions for defence, softening and moistening of epiphase of hair, humectants (proteins, hyaluronic acid and other polysaccharidess, vegetable extracts of oat, hydrolyzate of wheat, extracts of pulp of fruit, vegetable milk, phytoamine complexes, fatty alcohols, wax or natural oils (olive, eucalyptus, coconut, castor oil, corn oil, bee wax, mink fat, lanolin, oil from the embryos of seed of wheat, jojoba, shea, avocado et cetera), silicon oils, phosphatides, ethers of fatty acids, fatty acids of essential oil and other), reconstructors are required in the case of paratherapeutic dystrophy of hairs: hydrolyzated keratin, collagen, elastin, silk, casein, conditioners are increased by brilliance and elasticity of hairs, in the case of the cut hairs are agglutinative tags of hairs proteins and polysaccharides, temperature protectors are needed in the case of the use of hair dryer, hot tongs: polymers; sunscreens (SPF), brighteners are smoothed by keratinic scales: silicon oils (dimethicone, cyclomethicone). Bioactive additions making better the exchange of matters in the skin of hairy part of head: vitamins A, groups B (B2, B3, B6, B10), medical yeasts, flowers of camomile, calendulas, extracts of bamboo, chestnut, kiwi, clover, magnolia vine, sulfurwort, methionine, resin of juniper, ant acid and other. Strengthening the hair stem: vitamin A, nettle, henna, burdock butter, butter of avocado, jojoba, macadamia, castor oil, rice, oil of the Australian nut, corn, castor oil, soy-bean, embryos of wheat, sea-buckthorn, extract of mango, oat, juniper, borago and other.

4. Manual methods: nourishing masks, oily packs for hairs, SPA-treatment.

5. Vehicle methods: combination of manual cosmetology methods with the use of thermotherapy (infra-red lamps), chromotherapy.

**Hyperkeratinizations of scalp** are the issue of the day of modern dermatocosmetology and characterized in a number of clinical displays, obligatory among which is a presence of scurf. Times, when a scurf was considered temporal inconvenience a long ago passed and today it is considered the display of system problems of organism and some dermatosis. In addition, even insignificant appearance of scales on the skin of head and clothes

aesthetically unacceptable, results in psychological discomfort, social deadaptation. And the expressed displays of hyperkeratinizations of hairy part of head are reason of worsening of quality of life.

In modern medical literature I did not succeed to find out classification of hyperkeratinizations of hairy part of head or diseases, attended with formation of scurf, moreover, this group of pathologies separately is not selected. However exists not at all pharmaceutical and cosmetic preparations, testimonies to application of which is a presence of scurf. Taking into account the symptomatology of dermatosis, to the group of hyperkeratinizations of hairy part of head it is possible to take followings: seborrhea and seborrheic dermatitis, psoriasis, atopic dermatitis.

***Etiopathogenes of hyperkeratinizations of hairy part of head.*** The skin of scalp is characterized plenty of being in it large oil-glands. It is explained the far of hairs in this area, as a hair follicle is a single pilosebaceous complex. The number of complexes can arrive at  $460/m^2$ . The size of oil-glands has variations, related to the hair: to the long hairs the large oil-glands of 1th order are related, to the vellus hairs more shallow glands of 2th order are related. In very a few, only  $2-4\text{ sm}^2$ , the shallow onelobulose pieces of 3th order are present. Besides the presence of long terminal hairs and high level the skin of head differs the products of sebum the increased desquamation from the surface of keratinous nuclear-free cells. This continuous natural physiological process is needed for maintenance of tissue homeostasis of epidermis and providing of row of protective functions of skin. An important role in forming of barrier and protective functions of horny layer of epidermis is played by structural integrity of skin, immune and biochemical facilities of defence. The barrier functions of skin are provided by acid and waterlipid mantles, epidermis with a horny layerintrakeratinic cement, barrier area between corneocytes and grainy cages, skinassociated limphoid tissue, intraepidermal phagocytic system etc. In 1984 S.Schuster proved that exactly yeast fungus of *Pityrosporum ovale* is the basic exciter of pathological process which a scurf appears as a result of. Since lipophylic character of these yeasts was acknowledged and growing of their cultures became possible, different researchers looked after spontaneous transitions from one morphological type in other, that resulted in a conclusion that *Pityrosporum ovale*, *Pityrosporum orbiculare* and *Malassezia furfur* are just the variants of the same kind. When in 1996 *Pityrosporum* was anew classified in seven types of *Malassezia* genus, *Malassezia furfur* acknowledged a microorganism, responsible for formation of scurf and seborrheic dermatitis. Actually violation of barrier function of skin in combination with its high inflammatory allergic potential is underlaid atopic dermatitis. At atopic dermatitis patients is the lowered level of ceramides in lipids of horny layer. In addition for them the similar with seborrheic dermatitis changes of lipids the surface of skin are fixed: diminishing of content of squalene and general amount of lipids, increase of free fatty acids, cholesterol and his ethers. In this

case it is necessary to take into account not only irritating potential of free fatty acids, by an especially olein in the conditions of deficit linolic but also decline of tolerance of skin, high inflammatory potential, incident to this disease. In terms, cooperant growth of *Malassezia*, exactly its antigen properties can provoke allergic inflammation with an immune component and subsequent decorticating, as a mandatory morphological member of atopic dermatitis.

The cells of skin renew usually unnoticeable. Migration of cells of skin from the basal of epidermis to the horny layer makes 28 days. Cells exfoliate not noticeable an eye by scales. In the case of more short migration of cells 7–21 day; cells fall off flakes for 100–1000 cells. At psoriasis a cellular cycle diminishes from 311 to 36 hours and as a result appears in 28 times anymore keratinocytes, what in a norm, what is reason of appearance of scurf. However and insolveny of water-lipid mantle of skin, and also structures of epidermal barrier, takes a place at psoriasis, contamination is therefore possible by a saprophyte mycotic flora and complication of process the scurf of mycotic nature.

### **Clinic of scalp hyperkeratinization**

**Psoriasis of hairy part of head** is one of forms of ordinary psoriasis. For children and young persons quite often it is the first localization of defect, and for some patients and unique. In most cases, however, other areas of skin are affected sooner or later. Sometimes lesions on hairy part of head remain during many years, while in other places of change both appear or disappear. A lesions of head can be isolated or to combine with pouring out in other areas of body. An intensive itch is characteristic. Hairs do not fall out usually. On the skin of head the elements of rash are presented as name-plates, covered thick, hardness separated scales. Weeping and fissures are expressed, especially behind ears. Name-plates are located isolated or there can be a diffuse defect of all of hairy part of head. However much initial changes, especially for children, can be less certain. The lesions or diffuse decorticating without specific signs or asbestos-like decorticating can be marked. At the severe forms of psoriasis of hairy part of head of mass of scales form a dense cover which can spread outside hairy part of head. An intensive psilosis meets rarely enough, only at the psoriatic erythroderma, however enough often there is some increase of psilosis in the phase of telogen and diminishing of density of hairs within the limits of psoriasis name-plates. The diameter of stem of hairs, growings within the limits of psoriasis name-plate, is considerably diminished. Speed of growth of hairs at psoriasis is not increased.

At a **seborrhea** the skin of the staggered areas glitters more frequent than all, becomes porous, hairs are greasy, the mouths of oil-glands are stopped up the scaling cells of skin and, as a result, acne appear on the opened areas of skin, and on hairy part of head is a scurf. Rarer at a seborrhea a skin looks dry, here it is very sensible and sensitive, and a scurf is abundant and peels off easily. For this disease a chronic flow is also characteristic with the frequent



intensifying. Analysing the signs of disease and its flow, select a seborrhea oil, dry and mixed. Depending on physical and chemical composition of sebum distinguish the liquid and concrete oil seborrhea. At a liquid seborrhea a greasy secret has consistency of vegetable oil due to an increase in its amount of free fatty acids. The concrete form of oil seborrhea is characterized by considerable changes of component composition of sebum. It differs less by maintenance of free fatty acids and increase of amount of conjugated fatty acids and unsaponifiables, including cholesterol. A sebum becomes very concrete consistency due to large quantity of keratinous particles of epidermis.

A dry seborrhea is a disease of skin because of hypofunction of oil-glands. At this form of disease visibility of dry skin is created, a sebum is produced although, but it differs viscosity. It is badly selected from oil-glands, therefore the superficial layers of epidermis look overdried. A skin in this case is sensible and easy irritable. A scurf covers the skin of head and hairs completely, peels off easily, there is an itch. Sometimes a scurf accumulates on each other, forming crusts greyish-white or rather yellow grey colors. Decorticating develops either in a back-parietal area or on all of surface of hairy part of head. Hairs are dry, thin, with bifid ends, there is an abundant psilosis.

**Seborheic dermatitis (SD)** is a widespread chronic inflammatory papulo-squamous disease. Distinguish 3 clinical forms of SD of hairy part of head: dry type or simple scurf; oil type or seborrheic scurf; inflammatory type. A disease meets at persons of both sexes, but anymore for men. A tendency to activating of pathological process is observed in dry frosty months unlike a summer, when the clinical displays of disease can absent. Decorticating and inflammation skins, attended with an itch are examined as characteristic clinical symptoms of diseases. A classic variant is the symmetric engaging in the pathological process of skin of hairy part of head, scopes of growth of hairs, eyebrows, cilia of area of beard and moustaches. On a skin heads appear shallow flour-like white scales, or decorticating can accept large lamellar character. This variant of flow of SD is characterized by absence of changes on a skin and examined as a dry seborrhea. Many patients at presence of scurf produce complaints about a skin itch. In default of adequate treatment, a process makes progress, takes the new areas of a skin cover, and decorticating becomes more abundant. Inflammatory changes at this variant of course can be expressed insignificantly. More heavy course of SD is characterized by erythematous spots and plaques, covered flour-like or greasy scales, and on occasion by scale-crust and hemorrhagic crusts. In a process can be involved skin of forehead, behind ears, area of acoustic meatus, patients can complain about sense of permanent discomfort on the staggered areas of skin or intensive itch. If treatment is not conducted, papulae and plaques can appear on the smooth skin of face, backs, to the breast and on occasion complicated by secondary bacterial infection. This state is often observed at HIV-infected people. Seborrheic dermatitis met

for children to 6 month and in this case show up the bright red pouring out, not attended with an itch, with clear scopes on a trunk, by the diffuse defects of folds of skin and crusts on hairy part of head. Pouring out usually appear in age about 1 month on the skin of hairy part of head in the area of contiguity with a small bed, and also in the folds of inguinal area. Erythematous vesiculous of pouring out is more delimited from a healthy skin, what at a typical atopic eczema. On hairy part of head can appear large oil crusts (milk crust), while on other areas they are more dry and less sizes. The child of pouring out usually is not disturbed, because not accompanied an itch, therefore there are not problems with feeding or sleep.

At most patients the skin of hairy part of head suffers atopic dermatitis. Except for the characteristic signs of inflammation the skin of the staggered areas is characterized enhanceable dryness with the accumulation of shallow branny desquamation and scales. The seborrhea of hairy part of head develops at progress of process, quite often concomitant with atopic dermatitis and attended with formation of scurf.

**Cosmetic correction and treatment of scalp hyperkeratinization** is difficult and to the end not studied, require intent attention of specialist. Besides medications, in complex therapy facilities of medical cosmetics must be included necessarily. By dignity them there is that they do not have side actions, simple in application, are effective from point of cosmetology, because with their application not only the state of skin of hairy part of head but also hair is improved. More frequent than all preparations of medical cosmetics for the correction of hyperkeratinizations of hairy part of head are produced in form shampoos and lotions which must possess low acidity (less than 5.5). As in any case of hyperkeratinizations of hairy part of head it is impossible to eliminate contamination of skin by lipophilic fungus, more frequent than all treatment is begun with topic antimycotics. These substances are especially important at treatment of seborrheic dermatitis and dry seborrhea. Among them, the most effective is consider ketoconazole. As a rule, shampoos with ketoconazole be have to medicinal preparations. Also in the complement of medications other enters antimycotic imidazole row of climbazol. In the complement of preparations of medical Cosmetology usually such enter antimycotic imidazole row. Also a direct antimycotic action is rendered by connections of zinc: sulfate of zinc, pirolidon carboxylate of zinc, zinc salicylate, other zinc salts and connections of zinc with the sulfate of magnesium. Connections of zinc are very popular antidandruff substances and meet both in composition medicinal shampoos, mass-market and many preparations of medical cosmetics. Undecylenic acid and its derivatives possess bactericidal and fungicide activity also. Application in the special shampoos is found mainly alkilolamidny, sulfosuccinate and product of condensation of chloral hydrate of undecylenic acid with albuminous gidrolizatom. They combine in itself advantages of SAS and medical components.

The anti-dandruff substances for seborrhea and seborrheic dermatitis correction are antifungal, antiseptic, seborregulators, keratolytic and emollient agents. The isoflavones, 5- $\alpha$ -reductase blockers, antiseptic, keratolytic agents are used for seborrhea oleosa correction. The keratolytic and emollient agents are recommended for psoriasis correction. The regenerating, epidermal barrier reconstructing agents and wetting agent are inserted to the cosmetics for sensitive skin of pilar part of head.

The antifungal substances of cosmetics are clotrimasol, myconasol, climbasol. Some zinc compounds (pirocton olamin, pirytion), tar compounds have an antifungal activity. The some plant extractes show the fungicidal activity: Acorus calamus, Abies alba, inula, Cananga odorata lam., Cetraria islandica, Rosmarinus, henna, Malaleuca alternifolia, Piper nigrum, Populus nigra, Allium sativum, Eucalyptus.

#### **Correction:**

- 1. Consultation** of trichologist, dermatologist.
- 2. Individual cosmetic care.**
- 3. Methods of manual cosmetology:** chemical peeling at the hyperkeratinizations of scalp (AHA, BHA), cryomassage of scalp, SPA-treatment, massage of scalp by antidandruff lotions and oils.
- 4. Apparatus methods:** d'arsonvalization, iontophoresis of seborregulators (lotions, solutions), vaporising.

### **COSMETICS. HYDRO-, THALASSO-, PELOIDOTHERAPY. MAKE-UP COSMETICS**

**A cosmetic product** is any substance or preparation intended to be applied directly to different parts of the human body (epidermis, hair, nails, lips and external genitalia) or to teeth and oral mucosa with the sole or main purpose of cleaning them. To give a pleasant smell, change the appearance and/or correct odor, and/or protect them, or keep them in good condition. **Cosmetic product** - a product that is used to care for the skin, hair, oral cavity and performs hygienic, preventive and aesthetic functions. For the import and circulation of a cosmetic product, it is necessary to pass its certification - that is, to obtain a sanitary and hygienic conclusion.

Thus, two categories of cosmetics are legally defined in Ukraine: cosmetics and pharmaceuticals, the latter include pharmaceutical cosmetics. The former provide hygienic, preventive and decorative cosmetic care, that is, cleansing, moisturizing, nutrition, protection, camouflage, deodorization, etc. The second ones eliminate cosmetic imperfections, correct them (aesthetic effect), and are also used for therapeutic, prophylactic and diagnostic purposes. It is customary to divide cosmetics by price category (lower mass-market premium-elite), by functional purpose (hygienic, medical, decorative, professional, etc.), by topical

criteria (for face, body, hair, feet, intimate, oral, etc.), by age and gender (children, men, anti-aging, adolescent, pregnancy cosmetics, etc.) by forms (creams, lotions, gels, shampoos, toothpastes, etc.). The division of cosmetics into mass-market, pharmacy, professional and selective cosmetics is quite interesting and practically justified. Mass-market cosmetics are sold freely in stores, do not require the appointment of a specialist (doctor, cosmetologist, pharmacist), therefore, they are most often the subject of advertising. The price run is very wide: from the lowest price category to premium class. It is sold in supermarkets, markets, stalls, rarely in specialized cosmetic stores and pharmacies. Almost all brands that are distributed through direct sales (network marketing) also belong to the mass market. As a rule, this is a purely decorative or hygienic product, but in some cases we can talk about a preventive effect (sunscreen, anti-cellulite, moisturizing, etc.). Usually, the content of biologically active substances is negligible and the cosmetic effect of mass-market products is mainly due to the base.

In modern cosmetology, cosmetics are used that fall into the category of cosmetology. **Cosmeceuticals** is a category of drugs that are highly effective and occupy an intermediate position between cosmetics and medicines. The most demanded in cosmetology is professional cosmetics used only in the cosmetic service system. The requirements for such cosmetics are quite high, they are of high quality and must undergo clinical trials. **Professional cosmetics** must contain at least 100 names of products, at least 5 lines of care (oily, problematic, dry, fading skin, although up to 22 types are defined), at least 60 regulations for corrective cosmetic procedures. Professional lines usually include products for salon and home care. In modern cosmetology, medical cosmetics are used as well. These are cosmetics intended for specific care and correction of pathological conditions of the skin (dermatoses) and cosmetic defects exclusively at home, sold only in the pharmacy chain. These drugs are usually in clinical trials for safety and efficacy. Sometimes cosmetologists recommend to clients the use of luxury cosmetics (**selective cosmetics**). These are cosmetics of a high price category, as a rule, using the latest achievements of science, high-tech products that are sold only in specialized stores and are often produced by well-known brands in the fashion world. Such drugs are always sold in expensive fashionable packaging, have a hygienic, preventive, corrective effect, there is only a cosmetic range.

**The basis of a cosmetic product** is what remains of it, if **biologically active substances (BAS)** are subtracted. Active additives can be divided into deficient fillers (substances that the skin needs, such as vitamins, micro-macroelements, amino acids) Protectors (protect the skin from harmful factors, such as film-formers, antioxidants, cryoprotectant fats, anti-septic tanks modulators (change the rate and intensity of various physiological processes in the skin, for

example, enzymes, biostimulants, immunomodulators, selective regulators of molecular biosynthesis). However, most biologically active substances are difficult to fit into the framework of such a classification and, as a rule, biologically active substances have a complex, multifaceted effect on the skin.

### **Classification of modern cosmetics based on the nature of biologically active substances.**

1. Synthetic.
2. Semi-synthetic.
3. Natural:
  - 3.1. Microcosmetics (active components of microorganisms).
  - 3.2. Petrocosmetics (active components of minerals and elementary substances).
  - 3.3. Marine cosmetics (active ingredients of seafood)
  - 3.4. Entomocosmetics (active components of insects).
  - 3.5. Phytocosmetics (active components of plants).
  - 3.6. Xenocosmetics (active components of animals and birds).
  - 3.7. Allocosmetics (active components of human tissues).

Synthetic cosmetics are represented by preparations that include pharmaceutical synthetic substances: vitamins, photo filters, active peptides, antioxidants, stimulants, etc. Often these are synthetic analogs of expensive natural ingredients, so the price of synthetic cosmetics is not high. However, this direction is very promising, since scientific and technological progress allows annually to significantly expand the range of such substances.

Semi-synthetic. This group of active ingredients includes chemically modified natural substances. Such a modification enhances their positive properties used in cosmetics (isopropyl palmitate – obtained from plant oils; saponized edible oils). Mainly semi-synthetic components are used in the production of shampoos and soaps.

Natural cosmetics are often called "natural cosmetics", "organic cosmetics". Such drugs are very popular with the consumer, since in the minds of people, naturalness is associated with harmlessness and high quality. It should be understood that not all natural ingredients are harmless, just as not all "synthetic" substances are harmful. For example, in a day cream, mineral oil (provided it is well refined) or silicones may be safer on the skin than vegetable oils, which are easily oxidized. It must be remembered that even **natural cosmetics** can contain substances harmful to the skin, which are formed as a result of the activity of microorganisms (due to insufficiently reliable preservatives), or have got into cosmetics with plant extracts (solvent residues, agricultural chemicals, heavy metals accumulated by plants, etc.), or contained in the plants themselves (photosensitizers, allergens). The modern principles of creating cosmetic formulations are such that it is almost impossible to produce a 100 % natural cosmetic product for long-term storage, its composition will

necessarily include, if not synthetic, then at least semi-synthetic modified natural substances. An absolutely 100 % natural cosmetic product can only be made with your own hands - from natural, fresh fruits and vegetables, eggs, cottage cheese, sauerkraut, etc. Although today one has to doubt even the naturalness of the latter. Microcosmetics – cosmetics containing components of the activity of microorganisms as an active substance. The most famous cosmetics from this group are botox (botulism toxin used in salons for temporary muscle stretching), protein and aminoacid hydrolysates, hyaluronic acid. The negative point is the high antigenicity due to admixtures of proteins of the producer strain, which leads to allergenicity and rapid addiction to this substance.

Petroc cosmetics – cosmetics containing minerals and elementary compounds (bio-sulfur, gold, kaolin, magnesium aluminosilicate, sodium chloride, zinc oxide, oxygen) as an active substance. They are inexpensive ingredients used in cleansing and nutritional products.

Marine cosmetics – cosmetics containing components of seafood (algae, fish, crab, etc.) as an active substance, a huge group of cosmetics, widely represented in the modern cosmetics market alginates, agar-agar, algae extract, whale oil, shark liver oil, sturgeon caviar, fish proteins, crab chitin and chitosan, mussel extract, vitamins B2, B3, B6, etc.). The disadvantages of such substances are the quick addiction of the skin due to the high antigenicity of the active component and the narrow direction of the action. As a rule, they are used for cleansing, nourishing, moisturizing, and stimulating the skin.

Entomocosmetics – cosmetics containing insect vital components as an active substance. The most famous in this group are cosmetics with components of the vital functions of bees (royal jelly propolis, honey, beeswax). The characteristic of this cosmetic can be attributed to the limited source material, high antimicrobial properties. Due to its antigenicity to humans, resistance and addiction are quickly developed on it, although the first effect is strong. Any cosmetic product containing plant components can be called phyto-cosmetic. The composition of phytocosmetics, like any other cosmetics, includes a large number of components: these are all kinds of extracts, extracts, plant essences, vitamins, phytohormones, preservatives, aromatic fragrances and many other substances. Phytocosmetics, which are very popular today, with a long history, today uses both historically developed and innovative technologies for obtaining raw materials, the invaluable experience of pharmacists, herbalists, physicians, and cosmetologists. The advantage of plant raw materials is its availability, low cost, versatility, in the case of appropriate technological processing – a narrow focus of action. The disadvantage is that the skin quickly becomes accustomed to certain types of active substances, the need for frequent changes in cosmetic lines.

Xenocosmetics is based on biologically active substances isolated from animals and birds. Active substances of a xenogenic nature can be quite

expensive if they are released from the organs and tissues of unique animals. Although the bulk of the creams on the market have active ingredients from easily accessible organs of animals and birds (hyaluronic acid of bird crests, albumin and egg lecithin, cattle collagen, placenta extract from sheep, calves, cock semen, etc.). These substances have high nutritional and stimulating properties, however, resistance to them can develop over time. Considering the periodically flaring epidemics among domestic animals (mad cow disease, avian flu), consumers are cautious when purchasing such cosmetic products.

Allocosmetics as an active substance contains components isolated from human tissues. This is the youngest cosmetics that originated in biotechnology laboratories in the 90st of the last century and was an achievement in the development of medicine, genetic engineering and biotechnology. Its peculiarity is the limited starting material, the highest requirements for viral and microbiological purity, the high price of the active ingredient. A positive point is full compatibility with human skin components, high efficiency, lack of antigenicity and addiction. Such cosmetic products, in addition to cleansing, nourishing, protective, stimulating, moisturizing properties, have a replacement function as well. It is the chemical properties of the base that determine the shape of the cosmetic. The most popular **forms of cosmetics**: solutions (for example, lotion, toner), gels (for example, washing gel, cleansing mousse, moisturizing gel), creams (for example, cleansing milk, day cream, night cream) and many others. Usually the share of biologically active components in cosmetics is a few percent (and sometimes even a fraction of a percent).

**Creams** can be fatty (ointments) and emulsion. Ointments are prepared by fusing fatty components of varying degrees of hardness without adding water. When applied to the skin, the ointments seem sticky, poorly absorbed and leave a greasy shine, therefore they are used less often in modern cosmetology. Emulsion creams contain an aqueous and oil phase. In oil-in-emulsions water "oil droplets are suspended in an aqueous solution, and in emulsions of the" water-in-oil "type, on the contrary, water droplets are surrounded by an oil phase. The most common type of emulsion is oil-in-water, based on which a wide range of cosmetic products is created, ranging from nourishing creams to light milk or day cream. The oil phase of emulsion creams contains fats (saturated and/or unsaturated), hydrophobic emollients (substances that soften the skin), fat-soluble biologically active substances (for example, vitamin E), while the aqueous phase contains preservatives and water-soluble biologically active substances. An obligatory component of the emulsion system are **emulsifiers**. In addition, the emulsion may contain thickeners, colorants, UV filters, fragrances. A special group is made up of gels that do not contain fats. They are prepared on the basis of special substances – gelling agents, which, when mixed with water, form a viscous mass or solidify. When two immiscible

media (water and oil) are mixed, a very unstable system is formed. As soon as possible, it tries to separate into its constituent components. To prevent this from happening, emulsifiers are introduced into cosmetics. The emulsifier molecule has an elongated shape, one part of which is hydrophilic, and the other is lipophilic. Due to the peculiarities of their structure, emulsifiers are located at the interface between the oil and water phases, forming a thin layer between the phases and thereby preventing the coalescence of suspended droplets. Emulsifiers stabilize the emulsion and prevent segregation. The strongest emulsifiers are detergent surfactants. Their direct purpose is to dissolve fats when washing, washing dishes, washing, etc. Embedding in extensive fat deposits, these surfactants break them up into small droplets that are easily washed off with water. Detergent surfactants are one of the cheapest emulsifiers found in almost every cream. They are usually used to enhance the action of other emulsifiers. When applied to the skin, they act on the lipid barrier of the skin in the same way as all other fats - they break it down into separate droplets. They are toxic to cells as well, because they act destructively on the cell lipid membrane. Like all surfactants, they can penetrate deep into the skin, down to the cells of the germ layer of the epidermis, which, of course, is not good for the skin. Cationic and anionic surfactants are often the cause of allergic reactions and skin irritation. The toxic and irritating potential of all surfactants is different. Lauryl sodium sulfate is considered a classic skin irritant. But its ethoxylated counterpart, sodium laureth sulfate, is much less harmful. And yet, benefits can be derived from the ability of surfactants to break down the skin's lipid barrier. The fact is that many active additives are water-soluble and cannot independently penetrate the epidermal barrier. By breaking down the lipid layers between the stratum corneum, the surfactant increases the permeability of the epidermal barrier, allowing other substances to pass through it to the deeper layers of the skin. Correctly selected and balanced surfactant systems increase the permeability of the stratum corneum for active ingredients that would otherwise remain on the skin surface. In order to reduce the concentration of surfactants, co-emulsifiers are used in the formulation – substances that have an additional stabilizing effect on the emulsion. These are waxes (beeswax, jojoba wax, candelides), silicone-based emulsifiers, hydrocolloids (agar, pectin, gelatin, cholesterol, semi-synthetic and synthetic polymers). They are well compatible with the skin, but cosmetics based on them are more expensive, in addition, their emulsifying ability is still lower than that of surfactants. There are other interesting developments (for example, an emulsifier based on milk proteins, microbial polysaccharides).

Emollients must be included in the fat phase of the cosmetic product. **Emollient** translated from English means "softener", which fully reflects its main task - to soften the skin. We can say that the effect of the cream applied to



the skin is 99 % the effect of emollients. Emollients do not penetrate deep into the skin, therefore they do not have any effect on living cells. Their effect is in the full sense of the word cosmetic – a temporary improvement in the appearance of the skin without active intervention in its physiology. Emollients are fats and fat-like substances that have the property of being fixed in the stratum corneum, making the skin smooth and soft. As emollients fatty alcohols, waxes, esters, lanolin and its derivatives, natural fats and oils, as well as some silicone compounds (so-called silicone oils) are used. The most common emollients are ceresin, mineral oil, waxes (beeswax, carnauba, candelilla), isopropyl myristate, stearic alcohol, castor oil, as well as dimethicone and cyclomethicone silicones.

Emollients largely determine the consumer qualities of cosmetic products – easy of distribution over the skin, absorbency, appearance, sensations after application to the skin (feeling of smoothness, softness, silkiness). However, many emollients can have comedogenic potential by causing sebum blockage. When applied to the skin, the emollient remains on the surface, temporarily ironing and softening it, and does not affect living cells. In modern cosmetics, silicone oils are increasingly used as emollients, leaving organic fats and oils as active additives. With the advent of new silicone raw materials, which successfully replace organic compounds as emulsifiers and emollients, a rethinking of the role of oils and fats in the composition of cosmetic preparations has taken place.

Of the last decade, studies have shown how important lipids are for the skin, and have linked many pathological processes with an imbalance in the **lipid composition of the epidermis**. In principle, not too gross pathologies (for example, dry, flaky skin) can be successfully corrected with cosmetic means that from the outside compensate for the deficiency of some lipids. In modern cosmetic preparations, oils and fats begin to play the role of active ingredients that interfere with physiological processes in the skin, while the auxiliary functions are shifted to more inert silicones. When applied to the skin, fats can act as emollients, staying on the surface of the skin and making it smooth and soft, or they can penetrate into the deep layers, acting as active ingredients.

The penetrating ability (penetration) of natural fat or oil depends on how many free fatty acids it contains: the more of them, the higher the penetration. Fat used in cosmetics should contain as little free fatty acids as possible, since they are comedogenic. In order for vegetable or animal fat to show biological activity, it must be assimilated by the skin, in other words, it must be disassembled into its component parts, from which the substances necessary for the skin will then be synthesized. Triglycerides entering the skin with cosmetics are sources of fatty acids, from which ceramides, phospholipids and some other compounds (for example, prostaglandins – regulators of the inflammatory reaction) will be built, as from the parts of the constructor. Therefore, the properties of cosmetic oils are completely determined by the fatty acid composition of the triglyce-

rides of which they are composed. Most often, the skin lacks the so-called essential fatty acids – linoleic,  $\alpha$ -linolenic and  $\gamma$ -linolenic. Linoleic and  $\gamma$ -linolenic acids belong to the class of  $\omega$ -6-acids (chemical designation that shows where the double bond is located), and  $\alpha$ -linolenic acids belong to  $\omega$ -3-acids. For the normal functioning of the skin, it is necessary that  $\omega$ -6 and  $\omega$ -3-acids enter the body in the correct ratio – in the range of 4:1 – 1:1. With a deficiency of essential fatty acids in the body, first of all, the skin suffers – it begins to redden, peel off, becomes dry and irritated. This is due to the fact that essential fatty acids are essential building blocks for the lipid layers of the stratum corneum. Long polyunsaturated fatty acid chains are built from them, which cross-link lipid bilayers into multilayer layers. In the absence of essential fatty acids, lipid sheets break down into separate bilayers, which begin to mix with each other, forming gaps in the protective barrier. The lipid layer needs to be restored not only with a deficiency of essential fatty acids or other skin pathologies.

Applying any "stimulating" cream, we do not even think about the fact that, while nourishing the skin, we simultaneously destroy the lipid layer. This is done with a good purpose – to deliver to the deeper layers of the active components necessary for living skin cells. In this case, two mutually exclusive tasks are set for the same cosmetic product, the first of which is to destroy the epidermal barrier, and the second – in order to then restore it. The role of destroyers in the cosmetic formulation is assigned to surfactants and solvents, and the role of the repair team is played by lipids of oils and fats. They are embedded in lipid layers, fixing gaps in them and restoring their integrity. Cosmetics technologists even have a special term – a superfatty additive. Superfatty additives must be introduced into detergents (which most actively wash out epidermal lipids), ensuring the speedy restoration of the skin barrier.

Thus, **the role of lipids in the skin** consists of two main components: 1) the formation of the epidermal barrier and 2) participation in the metabolism of biologically active molecules. Without any doubt, substances that solve such important tasks can be considered as active additives. But there is one more problem that lipids can successfully solve, namely, increasing the permeability of the stratum corneum for other active components. When applied to the skin, lipids of fats and oils are incorporated into the intercellular lipid layers, changing their properties. If unsaturated lipids predominate in the oil phase, then the lipid layer between the corneocytes becomes more liquid, mobile, which means that water-soluble substances pass through better. Oils enriched in essential fatty acids are of the highest value. The richest in them are oils of seeds of black currant, borage, primrose. In addition, essential fatty acids are found in avocado, wheat germ, rapeseed, corn, soybean, rosehip, pumpkin, safflower, and rice bran oils. The unsaponifiable fraction of oils (consists of fat-soluble components of a non-glycerin nature) may contain substances useful for

the skin such as carotenoids, phytosterols, tocopherol, squalene. These substances have antioxidant activity, improve the structure of the skin, have a regenerating effect, and prevent aging. The widespread use of various cosmetic products requires a beautician to know their main properties and mechanisms of action on the skin. Water is one of the most common cleansers in cosmetology. However, water does not have high penetrating properties and is unable to emulsify sebum. Hard water combines with soaps to form insoluble particles that can irritate the skin. You can eliminate the hardness of water by distillation, boiling with further settling for several hours, as well as adding 0.5 teaspoon of borax with baking soda and glycerin, juice of cucumbers, apples, sauerkraut, tomatoes, vinegar or milk to the water.

Alcohol is a good solvent, has an antiseptic effect, 96 % alcohol causes coagulation of skin proteins, inflammation and flaking. Glycerin is hygroscopic, perfectly moisturizes and softens the skin of the face and hands. Cosmetic milk is an emulsion consisting of two, not mixing with each other liquid phases, one of which is "crushed" into the other in the form of small particles. Cleansing milk is a direct type of emulsion – oil in water. Cosmetic milk is widely used to cleanse the skin in the morning and evening before applying a nourishing cream. Milk dissolves lipids of the skin mantle, sweat, horny scales of the outer layer of the epidermis, opens pores into which impurities, sebum, keratin can easily penetrate, and, like a vacuum cleaner, draws out all the waste products of the skin. The cleansing milk is removed with a paper towel or sponges moistened with water. Lotion (tonic, eau de toilette) is used to cleanse, tone and refresh the skin. Sometimes 20–40 °C alcohol, antiseptics: salicylic, benzoic acids, plant extracts, sulfur are added to lotions. Such solutions are designed to treat certain problem skin imperfections. Creams are emulsions consisting of two phases and are of two types: oil-in-water and water-in-oil (indirect type emulsion). Emulsifiers for emulsions of the first type are waxes, for the second - pentol. In cosmetology, moisturizing, nourishing, protective, light-protective creams based on liposomal components, hormonal creams with cytokines, with fruit acids, anti-cellulite, etc. are used.

**Individual cosmetic care** is the independent rational use of cosmetic products for hygienic and therapeutic and prophylactic purposes. Allocate daily (hygiene), intensive (peelings, masks, patches, pseudofillers, pseudo-botox, wraps), special (camouflage with auto bronzes, etc.).

### The structure of personalized beauty care

Stages:	Forms:	Modes: Morning:	Evening:
1. Purification	1. Solutions (lotion, tonic, cosmetic water)	1. Purification	1. Purification
2. Toning	2. Gels and jellies (gel, gommage, foaming gel, mousse)	2. Toning	2. Toning

Stages:	Forms:	Modes: Morning:	Evening:
3. Moisturizing	3. Emulsions "oil in water" and "water in oil" (creams, serums, milk, balm)	3. Moisturizing/ + Additional care	3. Nutrition/+ Additional care Intensive care is usually carried out 1–2 times a week, more often in the evening Special care is provided as needed
4. Nutrition	4. Cream gel	4. Protection	
5. Additional care (local remedy, etc.)	5. Emulsion-suspension (liquid talc, scrub)	5. Camouflage	
6. Protection	6. Ointment		
7. Camouflage	7. Paste and suspension (clay mask)		
	8. Oil		
	9. Patch		
	10. Pencil		
	11. Masks: cream, impregnated textiles, film mask, gel, etc.		
	12. Soaps		
	13. Sticks		

## INJECTION METHODS IN COSMETOLOGY. PEELINGS. CELL THERAPY

**Mesotherapy** is a technique of microinjection using a syringe with a fine needle or a special injector, non-injection mesotherapy. Allopathic and homeopathic special preparations for mesotherapy are used. Mesotherapy is a medical treatment technique used in orthopedics, traumatology, dentistry, sports medicine, dermatology, neurology and other medical fields. In aesthetic medicine, it is used for the purpose of rejuvenation, correction of scars, dyschromias, alopecia, cellulite, etc. Mesotherapy involves the local introduction of small doses of medicinal or biologically active drugs into the middle layer of the skin. The basic principle of mesotherapy was formed by its founder Michel Pistor, and sounds like this: "Little, rarely, in the right place." Mesotherapy implies the use of a small amount of pharmacological substances in the form of a liquid filler with a pH indicator close to the internal environment. Doses used in mesotherapy are 10–100 times less than doses used in other administrations. For example, the volume of injections into the face area is 1–5 ml. Basically, the course of mesotherapy consists of a main (intensive) course (4–6 sessions once every 7 days) and a supporting one (1–2 times a month). A second course is possible in 6–12 months. As a rule, injections are performed to a dermis depth of 0.5–4 mm. The depth of injection depends on the thickness of the skin, indications, the area of administration of the drug, the composition of the drug. At a given depth of administration of the drug, its slow resorption and prolonged therapeutic effect. The use of low concentrations of acids (glycolic,

salicylic, retinoic) in a mesotherapeutic cocktail is called mesopilling, botulinum toxin – mesobotox, hyaluronic acid - biorevitalization.

### Mesotherapy classification

Type of mesotherapy	Varieties
by the method of carrying out mesotherapy	<ol style="list-style-type: none"> <li>1. Manual (manual) use disposable syringes with a volume of 2,3,5 cm<sup>3</sup> (for work on the face) and 5,10 cm<sup>3</sup> (for work on the body). Mostly a classic needle is used. The advantage of this method is that it allows you to work in the most delicate with the thinnest skin (eyelids, neck, hands), and besides, it does not require significant additional costs.</li> <li>2. Mechanical mesotherapy use a special injector "mesopistol". The action of the injectors is divided into mechanical and electronic, as well as autonomous and non-autonomous. The advantage of this method is less painful injections, which is most important when treating large areas of skin, in addition, it significantly speeds up and facilitates the work of the mesotherapist</li> </ol>
by drug availability	<ol style="list-style-type: none"> <li>1. Dry technique of mesotherapy - acupuncture therapy without the introduction of drugs.</li> <li>2. Wet mesotherapy is performed with the presence of the drug in the form of a solution.</li> <li>3. Electric combination of wet mesotherapy with physiotherapy techniques</li> </ol>
by depth of impact	<ol style="list-style-type: none"> <li>1. Superficial injections from 0 to 2 mm (napazh and papule).</li> <li>2. Deep injections from 2 to 10 mm (mesoperfusion, systematic point mesotherapy)</li> </ol>
by the method of drug administration	<ol style="list-style-type: none"> <li>1. Napazh - microinjections directly under the epidermis, the angle of the needle is 5. Only a 1 mm needle section is inserted into the skin, the dose of the drug is 0.001–0.002 ml, the diameter of the papules is not more than 1 mm, the distance between them is 2–3 mm. The nappage can be superficial, external, medium and glib. This is a fast technique that significantly stimulates the skin, requires low consumption of drugs, does not cause bleeding, and makes all areas accessible.</li> <li>2. Superficial dermal papule or "single injection" technique. The injection is carried out into the middle layer of the dermis, the angle of inclination of the needle is 15-30, the depth of penetration of the needle is 1 mm, the dose of the drug is 0.008–0.01 ml, the diameter of the papules is 2–3 mm, the distance between them is 7–8 mm.</li> <li>3. Intradermal deep papule - injection into the deep layer of the dermis. The angle of inclination of the needle is 45–60, the dose of the drug is 0.05-0.07 ml. The diameter of the papules is 5–7 mm, the distance between them is 1.5–2 cm. This technique works great in the projection area of wrinkles and when carrying out anti-cellulite body correction.</li> <li>4. Mesoperfusion – subcutaneous injection lasting 2–3 sec. In this case, approximately 0.1 mm of the drug is injected.</li> <li>5. Mesoinfiltration - the introduction of large volumes of the drug locally.</li> <li>6. Systematic point-by-point therapy. Intradermal injections are applied without intervals at the dosage required for the problem area. It is used to eliminate wrinkles and stretch marks.</li> <li>7. Linear retrograde (tracing). The needle is inserted to its full length, and then, with its slow reverse withdrawal, a microdose of the drug is injected (approximately 0.05)</li> <li>8. Mesh. Combination of linear and papular techniques.</li> <li>9. Fan. The needle is inserted into the skin to its full length, but not withdrawn from it, but retracted to the side – in this way, a new injection is made. This technique is designed to break down old collagen and create new passages.</li> <li>10. Needleless techniques. This alternative has arisen due to the spread of dangerous infections and pain. Indicated for patients for whom classical mesotherapy is not acceptable</li> </ol>

Homeopathic and allopathic medicines are used in mesotherapy. As a rule, these are aqueous, isotonic solutions with a neutral pH, which do not contain oil carriers (due to the risk of fatty thrombosis) and do not cause the formation of nodules, local necrosis, tissue lysis, and do not cause allergic reactions, either general or local. Preparations are either separately taken solutes, or a mixture of substances called "cocktail", in which the components are selected according to the therapeutic effect.

Mesolift is a type of mesotherapeutic procedure aimed at leveling wrinkles, increasing skin tone and elasticity. The cocktail for the Mesolift procedure uses vitamins, antioxidants, DMAE (dimethylamino-tanol), glycolic acid, hyaluronic acid, etc. Mesoglou is a type of mesotherapy procedure aimed at improving skin color. The cocktail for Mesoglou contains powerful antioxidants, sometimes peptides. Mesosculpt is a type of mesotherapeutic procedure aimed at weight loss, elimination of local fat deposits on the face and body, and cellulite. The composition of such cocktails includes phosphatidylcholine, organic acids, levo-carnitine, rutin, triiodothyrox to-that, meliloto extract, etc.

**Use of neurotoxins for aesthetic purposes.**

Injections of **botulinum toxin type A** preparations (Botox, Dysport, BTXA) for the purpose of eliminating microwaves and hyperhidrosis, as well as in sophisticated modern techniques: dysport-lifting and mesobo-tox. The preparations are microscopic doses of Clostridium botulinum, a highly purified toxin with a large dilution, 1000 times weaker than in medicine. The toxin causes temporary paralysis of the striated muscles at the injection site. For the first time, the drug was used in neurology and ophthalmology, where a curious side effect was noted – smoothing of wrinkles. The activity of a drug is measured in international biological units. The clinical effect depends on the concentration, injection site and volume of the solution. The larger the dose of the toxin is injected, the faster the effect will come. In small doses, the drug does not work immediately, its effect appears after 1–2 weeks. With the introduction of medium doses of Botox, the first manifestations of the clinical effect are observed within 24–72 hours, and the maximum effect is only 2 weeks after the injection. When using large doses of the drug, the clinical effect in some cases is noted as early as 6 hours after its administration.

**Characterization of local muscle relaxants based on botulinum toxin in aesthetic medicine**

BOTOX® (100 U/vial) (Allergan, USA)	DISPORT® (500 U/vial) (Ipsen, France)
5 ng botulinum toxin type A (neurotoxin protein complex), 900,000 ng sodium chloride 500,000 ng albumin	12.5 ng Botulinum Toxin Type A(neurotoxin protein complex), 2,500,000 ng lactose, 125,000 ng albumin
pH 7	pH 7
Shelf life from the date of production is not higher than — 5°C	Shelf life from the date of production 1 year at a temperature of +2–+8 °C

BOTOX® (100 U/vial) (Allergan, USA)	DISPORT® (500 U/vial) (Ipsen, France)
Shelf life from the moment of dilution 4 hours at a temperature of +2–+8 °C	1 hour at a temperature of +2–+8 °C
Clostridium botulinum HALL strain type A	The bacteria strain used for production has not been officially reported
Vacuum drying to lyophilisate	Freeze drying
FDA and NIBSC approved	NIBS approved
The effect lasts for 12–12.5 weeks	The effect lasts for 6–8 weeks

Technique: the needle is inserted over the most pronounced wrinkle from one of its ends. Then the patient is asked to frown or squint so that the wrinkle becomes especially noticeable. The toxin is then injected while the needle is withdrawn. After the injection, the patient is recommended to maintain an upright position for at least 4 hours, during the day to make active mimic movements of the muscles into which the drug was injected, not to rub or massage the injection site. The clinical effect of Botox appears every other day and lasts for about six months. For the result to be permanent and satisfactory, the procedure must be repeated during the first year - three times, during the second year – two, then one per year. In current clinical practice, Botox® and Dysport® are used in a dosage ratio of 1:4 or 1:5. The main contraindications to the procedure are pregnancy and lactation, mental or medical contraindications, malignant myasthenia gravis, allergy to aminoglycoside antibiotics, amyotrophic sclerosis, infection at the injection site.

**Contour plasty (soft tissue augmentation)** - the introduction of special preparations (fillers and implants) into various layers of the dermis in order to change the volume and contour of the lips, level wrinkles, improve the elastic properties of the skin, fill in scars.

Techniques used:

- The technique of multipoint injections, accompanied by swelling and discoloration of the skin. All these phenomena disappear one hour after the absorption of the saline solution and the collagen thickening. Each point of introduction should be massaged.

- The tracing technique provides a more uniform injection. The dermis is pierced at regular intervals of 1–2 cm, the injection is carried out on the reverse course of the needle.

- The "layering" technique is used for deeper wrinkles. It consists in the introduction of ziplast into the deep layers of the dermis and zyderm in the middle and superficial dermis to fill the residual depressions. After each type of injection, massage is performed for 1–3 minutes.

## Characteristics of fillers in cosmetology

Filler	Indication	Treatment	Side effects
<b>Autologous fillers</b>			
Own adipose tissue (hypodermis of The thighs, abdomen or sides of the trunk)	Correction of facial lipoatrophy, deep wrinkles	Injection into the subcutaneous fat layer and/or muscle. Additional correction required	Prolonged edema, hematoma, fat migration, uneven relief, formation of conglomerates, necrosis of adipose tissue, infection
Fat Autograft Intramuscular Injections (FAMI)	Correction of facial muscle atrophy	Anesthesia is required. Small punctures are made in the central frontal part along the hairline, in the jaw arches, oral commissures, and lateral parts of the chin. Injections are made directly into the muscles and surrounding tissues. A second visit is required in a month. The effect is long lasting	Rare complications include edema, hematoma, scarring, infection, and dyschromia
Autologous culture of human fibroblasts	Stimulation of skin collagen formation	The soft tissue defect should beat least 20–30 %. Anesthesia is required. A minimum of 3 injections are given over several weeks. The duration of the effect is 3–6 months	There is no risk of vector-borne diseases and allergic reactions due to the autologous nature of the material
<b>Cadaveric implants</b>			
AlloDerm (acellular allogeneic dermis)	Used to close defects after burns, excision of malignant tissue, correction of soft tissue defects, lip augmentation	Small incisions are made from two corners of the mouth. The tool is moved from one corner of the mouth to the other, making a tunnel. Implant from one end of the tunnel to the other. The duration of the effect is 6–24 months, sometimes several years	The main complication is the need for correction. The absence of cellular elements reduces the immunogenicity of the material
Acellular allogeneic dermis (Zimetra)	Correction of wrinkles, nasolabial folds, lips	Injections into the middle reticular layer. An additional allergy test is recommended. May be an alternative for patients allergic to bovine collagen. The duration of the effect is 3–6 months	Hematoma, redness, swelling, skin wrinkling
Lyophilized human fascia (Fascian)	Stimulates the formation of skin collagen	Before use, it is rehydrated with saline or saline with lidocaine. The duration of the effect is 3–8 months	Edema, erythema, ecchymosis, post-inflammatory hyperpigmentation, hematoma, tenderness,



Filler	Indication	Treatment	Side effects
Temporary fillers (absorbable)			
Bovine collagen preparations			
Zyderm bovine dermal collagen dispersed with phosphate buffer and saline with 0.3 % lidocaine	Correction of wrinkles, scars, lip augmentation. Low-concentration filler for leveling superficial wrinkles, small scars, thinned skin areas, high-concentration filler is used to correct medium wrinkles and scars	Intradermal injection into the superficial layers of the papillary dermis. Allergy test required. Local anesthesia may be used. Average duration is 3–6 months	The need for correction. May cause allergic reactions
Ziplast structured with glutaraldehyde in suspension with saline and lidocaine 3 mg/ml	Correction of wrinkles, scars, lip augmentation. It is used as a base in the correction of nasolabial folds and oral commissures together with unstructured bovine collagen overlay method. Also used to sharpen the red border of the lips. Not used to correct superficial wrinkles and glabellar wrinkles	It is injected into the mid-reticular and deep reticular dermis. Allergy test required. Local anesthesia may be used	The need for correction. May cause allergic reactions
Cosmoderm Human collagen isolated from human fibroblast cell culture	For the correction of superficial skin defects, superficial wrinkles and scars	Anesthetic cream may be required. No allergy test is required. Average duration is 3	6 months. Mild edema, erythema, hematoma, palpable lumps
Cosmoplast Human collagen structured with glutaraldehyde	For the correction of scars and deep wrinkles		
Hyaluronic acid preparations			
Restylane hyaluronic acid obtained in a bacterial enzymatic process	Perlane 20 mg/ml stabilized hyaluronic acid with approximately 10,000 gel particle/ml is recommended for nasolabial fold correction and lip augmentation	Injection into the deep dermis or upper layers of the hypodermis	Redness, edema, local granulomatous reaction, bacterial infection, acneform and cystic rashes, hypersensitivity is possible, which decreases with the introduction of more purified hyaluronic acid preparations. Do not need correction
	Restylane 20 mg/ml stabilized hyaluronic acid with approximately 100,000 gel particles/ml is recommended for the correction of glabella wrinkles, oral commissures, lip plumping and lip contour enhancement Mid	dermis injection	
	Restylane Fine Lines 20 mg/ml stabilized hya-	Upper dermis injections	

Filler	Indication	Treatment	Side effects
	luronic acid with approximately 200,000 gel particles/ml is recommended for the correction of fine line wrinkles, anger lines, periorbital and perioral wrinkles.Upper dermis injections		
Juvederm Non-animal viscoelastic hyaluronic acid gel	18 mg/g for the correction of superficial wrinkles Injections into the superficial dermis	Injections into the superficial dermis	Redness, edema, local granulomatous reaction, bacterial infection, acneform and cystic rashes, hypersensitivity is possible, which decreases with the introduction of more purified hyaluronic acid preparations
	24 mg/g to correct deep wrinkles Injections into the middle part of the dermis	Injections into the middle part of the dermis	
	30 mg/g to correct deep wrinkles, nasolabial folds, to increase the volume of lips and cheeks	Injection into the middle and deep dermis Absorbs completely into body tissues. Duration 3–6 months.	
Gilaform Viscoelastic hyaluronic acid gel from rooster combs	For cosmetic purposes	May require local anesthesia. An allergy test is required as it is of avian origin. The result is immediate, lasting 3–6 months.	Delayed inflammatory skin reactions
Lactic acid preparations			
Sculptra / New Fill Poly-L-lactic acid	Used as an absorbable suture, for the treatment of HIV-associated lipoatrophy, the correction of superficial wrinkles and more visible folds of the skin, to increase the volume of various areas of the face – sagging cheeks, cheekbones, chin	Injections into the deep dermis or at the border of the dermis and hypodermis, small and noticeable nodules, skin discoloration may occur. The effect lasts 4–6 weeks and lasts 12–18 weeks.	Infections, allergic reactions, inflammatory granulomas
Permanent fillers (non-absorbable)			
Semi-permanent fillers			
Radies/Radians Synthetic calcium hydroxyapatite microspherical suspended in a polysaccharide gel	To increase the volume of the vocal cords, to treat urinary incontinence	Subdermal injections. Intradermal administration may cause swelling, pain, redness, visible or palpable granules. Light correction required. Massage at the injection point is recommended immediately after injection. A skin test is required. Repeat the injection after 1–3 months.	Itching, hypertrophic scars, allergic reaction to the implant. Removal of hydroxyapatite is not easy, therefore corticosteroid injections are necessary if excessive collagen formation develops

Filler	Indication	Treatment	Side effects
Artecoll/Artefill	For the correction of wrinkles, scars, lip augmentation, sagging, deep folds	Tunneling technique injections into the dermo-hypodermal junction. Repeat injections every 6 weeks to the required volume. Allergy test required	May cause inflammation, induration, ulceration, discoloration, granuloma formation
Polymethyl methacrylate microspheres in denatured bovine collagen	For the correction of medium and deep wrinkles, sagging, for the treatment of retinal detachment and hemorrhages	Drops of silicone oil, falling into the dermis, spread into the tissue, forming fibrosis around the drops. This explains the increase in volume. No allergy test is required.	Risk of infection, granuloma formation, where silicone is encapsulated as a foreign body, causing a chronic inflammatory response. Migration to other tissues and lymph nodes is possible
<b>Implants</b>			
Ultrasoft Softform Polytetrafluoroethylen	For subdermal enlargement. Softform is used for lip contour, nasolabial folds. Ultrasoft is used for cheeks and temples. They are used to increase the volume of lips and smooth out perioral wrinkles	Performed under local anesthesia, an implant of suitable length and width is inserted subdermally through a 14 or 16 gauge angiocatheter	Higher risk of infections
Gore-tex Double porous polytetrafluoroethyl	Used for vascular grafting, as an implant and tissue repair	Performed under local anesthesia, an implant of suitable length and width is inserted subdermally through a 14 or 16 gauge angiocatheter	Edema and hematoma, fistula formation, implant expulsion

### **Sclerotherapy**

**Vascular hardening** is used to remove vessels with a diameter of 1–3 mm. A sclerosant is injected into the venule lumen by injection, causing a chemical burn of the endothelium, after which a pressure bandage is applied to the region of the vessel. Not used on the face. Indications: treatment of varicose veins, telangiectasias, reticular veins of the lower extremities, prevention of complications from these diseases, elimination of the symptoms of these pathologies, improvement of impaired hemodynamics, achievement of a result that meets aesthetic and functional criteria. Sclerotherapy is considered the method of choice in the treatment of small intradermal varicose veins (reticular veins, teleangiectatic veins).

## Characteristics of sclerosants

Type of sclerosant	Possible	Side effects
Osmotic agents	Hypertonic saline solution 18–30 %	Low allergic potential, cellular tissue damage, ulceration, pain, necrosis, hyperpigmentation, muscle cramps
	Hypertonic dextrose saline solution (Sclerodex) 250 mg/l dextrose, 100 mg/l sodium chloride, 100 mg/ml propylene glycol, 8 mg/ml phenethyl alcohol	Pain and muscle spasms are minimal. Superficial necrosis, allergic reactions, hyperpigmentation
Chemical irritants	Glycerin chromate (Scleremo) 1.11 % glycerol chromate	Hyperpigmentation, necrosis, hematoma, weak agent requiring repeated injections, high viscosity, pain
	Iodide iodide (Variglobin, Sclerodine) aqueous solution of iodine ions, sodium iodide, benzyl alcohol	Causes endothelial destruction, necrosis, pain
Sclerosing solutions based on detergents	Sodium salts of saturated and unsaturated fatty acids of cod liver oil	Very alkaline, necrosis, allergies up to anaphylaxis, pain
	Ethanolamine Oleate (Etamoline) – Ethanolamine and Oleic Acid	Low risk of allergic reactions, hemolysis, pain, kidney damage, pulmonary toxicity
	Sodium tetradecyl sulfate (sodium 1-isobutyl-4-ethyl octyl sulfate, benzoyl alcohol 2 %, phosphate)	Epidermal necrosis, allergic reactions, hyperpigmentation, pain
	Polidocanol (Ethoxysclerol) hydroxypolyethoxydodecane, distilled water, ethyl alcohol	Does not form ulcers, necrosis is extremely rare, allergic reactions are extremely rare, mild hyperpigmentation, painless

### *Peelings. Cell therapy.*

Peeling – exfoliation of various layers of the epidermis. According to the depth of peeling, peelings are divided into superficial, middle and deep. According to the mechanism of action, peels are divided into mechanical - surface (scrub, phytopeeling, brossage), middle (microdermabrasion) and deep (dermabrasion); chemical – surface (fruit acids, retinoids – 5 % retinoic acid, retinol, retinaldehyde, tretinoin, alkaline), medium (trichloroacetic and salicylic acid) and deep (phenolic acid) and physical - surface (ultrasound, erbium laser) , middle (erbium laser), deep (carbon dioxide laser). Manual, hardware and dermatosurgical techniques are used.

### Characteristics of chemical peels

Depth peeling	Substance and concentration	Indications	Contraindications
Surface (epidermal necrosis)	Glycolic acid 20–70 % Salicylic acid 20–30 % Resorcinol 20–50 % (5–10 min) Jessner's solution (salicylic acid, lactic acid and resorcinol in 95 ethanol) (1–3 layers)	Superficial wrinkles, photoaging 1 tsp. Glogau, atrophic post-acne scars	Active herpes simplex, active eczema
	Trichloroacetic acid 10–35 % (1 layer) Microdermabrasion (2 pass)	Melasma, epidermal post-inflammatory hyperpigmentation, youthful acne, macular dyschromia (ethnic skin)	Sunburn, use of isotretinoin in the past year, skin cancer

Depth peeling	Substance and concentration	Indications	Contraindications
Median (papillary dermis necrosis)	Phenol 88 % Glycolic acid 70 % (5–30 min) Trichloroacetic acid 35 % in combination with: Glycolic acid (50–70 %) Liquid carbon dioxide Jesner's solution Pyruvic acid 40–70 % Becker's Modified Peeling (2 drops of croton oil)	Photoaging 2–3 tbsp. Glogau, actinic keratosis, melasma, dermal atrophic acne scars, melanin dyschromias	Active herpes simplex, active eczema, pigmented skin
Deep (necrosis of the reticular dermis)	Becker-Gordon phenol peeling (3 ml 88 % phenol, 3 drops of croton oil, 8 drops of septisol, 2 ml of distilled water) Trichloroacetic acid 50 %	Photoaging 4 stages by Glasgow, lentigo	Active herpes simplex, active eczema, highly pigmented skin, heart, kidney, liver diseases

Effects obtained from facial peeling, after make-up removal and vaporization:

- removal of small epidermal microfines with the stratum corneum;
- smoothing out skin irregularities;
- removal of waste products of the sebaceous and sweat glands, makeup residues, removal of accumulated free radicals from the skin;
- stimulation of regenerative processes, facilitating the rejection of the stratum corneum, which is represented by keratohyalin scales glued together;
- activation of proliferative processes in the cells of the basal and prickly layer, which determines the growth and regeneration of the skin;
- creating conditions and preparing the skin for the perception of cosmetic masks and creams.

Peeling of oily skin is carried out 1–3 times a week according to indications, dry 1 time in two weeks, normal – 1 time per month.

Body skin peeling is carried out before massage: manual, vibration vacuum, before wrapping to create conditions for better penetration of substances into the skin that break down fat cells.

Facial peeling is subdivided into cosmetic, mechanical, using electric current and chemical. Cosmetic peeling can be herbal (phytogommage) and biological (enzyme masks). Mechanical peeling, manual or hardware, is more superficial and removes only those stratum corneum keratinocytes that are capable of self-rejection. Herbal peeling (phytogommage) has the same properties. Biological peeling is deeper, as it allows using enzymes (trypsin, lidase) to dissolve the bonds between the deep layers of the stratum corneum keratinocytes and cleanse the skin. Chemical peeling, carried out by fruit acids, is aimed not only at the stratum corneum, but also at the shiny, granular one, and causes not only the destruction of the bonds between the cells, but also their burns with subsequent desquamation, stimulates cell proliferation in the

deep-lying thorny and basal layers of the epidermis. Hardware peeling can be performed with brushes (brossage), vacuum method, and ultrasound.

Hardware peeling (**brossage**) is carried out using rotating brushes. Two brushes of different degrees of hardness are intended for the face skin and one for the body. After make-up removal, vaporization or warm compress is carried out. The steamed skin is soaked with napkins, and then an exfoliating emulsion or a scrub with small grains is applied. The rotating brushes, the direction of movement of which and the intensity are regulated, loosen and exfoliate the keratogialin layers of the keratogialin along the massage lines. Depending on the type of skin, the time of the procedure can vary from 5 to 7 minutes. up to 12 min. Remains of exfoliating emulsion or scrub are removed with cotton sponges moistened with water. The skin surface is smoothed, leveled, favorable conditions are created for the absorption of cosmetic masks and creams. In addition to the usual cleansing, brassage has a beneficial effect on the blood circulation of the skin, being a kind of massage. The brossage can be replaced with vacuum cleaning and a mask. Contaminated brushes are washed under running water with soap and then disinfected in a sterilizer under the influence of ultraviolet rays for 10–15 minutes. The body skin is thrown with a special brush along the massage lines and lymphatic drainage pathways. Skin peeling (brossage) is a basic cosmetic procedure and is carried out after vaporization.

Contraindications to brassage: chronic dermatoses in the exacerbation phase, acute inflammatory processes (herpes), acne vulgaris, rosacea, dilated capillary network and multiple telangiectasias.

**Microdermabrasion method** based on crystal peeling. The microabrasion procedure enhances tissue metabolism, increases skin hydration, has a cleansing effect, and produces a mechanical superficial and middle peeling. It is used for resurfacing scars, reducing the depth of wrinkles, improving skin relief and color. Sandblasting micro-grinding is carried out using a manipulator connected to a vacuum unit. Under pressure, a jet of special powder (aluminum or biopolymer) is applied to the skin from the manipulator, which produces the peeling. Almost at the same time, excess powder and exfoliated epidermis are sucked into a special reservoir. The remaining powder is removed with a brush, after which an antiseptic anti-inflammatory mask is applied, which is removed after 30–40 minutes. Diamond dermabrasion is performed using special rotating metal nozzles covered with diamond particles of various sizes. 3 levels of exposure are possible (exfoliation of the stratum corneum, treatment of the papillary dermis with and without bleeding, treatment of deep dermis with bleeding). Indications – fine wrinkles, hyperpigmentation (chloasma), skin irregularities in color and texture, hyperkeratosis, seborrhea, rosacea, rosacea, striae, acne scars, atrophic scars, tattoo removal. Mechanical deep peeling – a standard dermabrasion with a Schumann cutter – is of historical importance

today, as it gives a high percentage of complications and an uncomfortable recovery period. It is indicated for the correction of wrinkles, scars, nevi, rhinophyma. To treat the area around the eyes and mouth, a cauter is used (a metal loop, heated with direct current to red heat).

**Laser peeling** (laser resurfacing, laser dermabrasion) – the use of high-intensity laser radiation to level the relief and skin color. The absorption of the energy of laser pulses by the outer layers of the keratinizing epidermis causes their heating and evaporation. In this case, due to the low energy of the laser radiation quanta around the ablation region, irreversible changes in the underlying layers of the epidermis do not occur. Subsequent re-epithelialization is characterized by the formation of a structurally ordered epidermis, which evens out the relief of the skin and has a uniform pigmentation. Laser deep dermal peeling enhances the microcirculation of the dermis, the degree of its hydration, the proliferation of cellular and connective tissue elements, and local immunity. As a result, turgor increases, the dermis thickens, and the depth of wrinkles decreases. In addition to the layer-by-layer removal of the skin layers, laser radiation causes retraction (contraction) of the skin due to collagen compression, which leads to a lifting effect. Indications: hyperkeratosis, hyperpigmentation, photoaging, wrinkles without excess skin, scars, tattoos, prevention of aging, preparation for plastic surgery. For these purposes, a carbon dioxide laser (1060 nm) and an erbium laser (2940 nm) are used.

### Complications of peels

	Local	System
Transient	Infections Pigmentation disorders Ecchymosis Irritable skin (subjective dermatitis) Contact allergy Contact urticaria Acneform eruptions	Cardiac arrhythmia Laryngeal edema Toxic shock syndrome Salicisim Ochronosis Myxedema Methemoglobinemia Hypotension Collapse
Persistent	Dyschromia Scarring Persistent erythema Sensitive skin Skin texture changes Skin atrophy Milia	

**Contraindications to peeling are:** active labial herpes, 4-6 skin phototypes for TCA and salicylic peeling, plastic surgery within the last 6 months, aspirin allergy (for salicylic acid), use of isotretinoin in the last (3-6 months for surface peeling, 6–12 months for the middle and deep), taking

anticoagulants (mid-deep), the use of local radiotherapy, a burdened history of keloids (mid-deep), pregnancy and lactation, smoking (mid-deep), professions associated with sun exposure, inflammatory dermatoses in the peeling area (eczema, psoriasis, urticaria, seborrheic dermatitis).

**Cell therapy.** Means for cell therapy, as a rule, are extracts of embryonic tissues (i.e., embryonic cells) from humans or animals, such as lambs, preparations of the human placenta. The basis of cell therapy is the presence of stem cells in the biological products used, as well as numerous low molecular weight proteins, hormones and human growth factors.

Historically, fetal cells, as well as umbilical cord blood, were used as stimulants in ancient times, and at the dawn of our century – for rejuvenation and treatment of endocrine and hematopoietic diseases. This method was known in medicine as the "Brown-Sequard method", after the name of its developer. These were mainly tissues of animal origin or cadaveric tissues and their fragments. Advances in their application have not been as significant as might be expected from the theoretical assumptions. Therefore, for many years, these methods remained largely the property of the history of medicine and did not find a worthy place in the complex of treatment of various diseases. Stem cells are the fundamental principle of the body, from which all 240 types of specialized cells and tissues of the body originate. Stem cells are found in large quantities in the umbilical cord blood, in the human embryo, in the placental complex, in the bone marrow of adults. Their main feature is the ability to self-sustain (telomerase enzyme is present). That is, stem cells are theoretically eternal. In reality, as a result of past infections, trauma, hereditary disorders, harmful environmental factors, emotional stress, stem cells lose their ability to endlessly regenerate and, in fact, this is where the aging process begins or the onset of long-term diseases, which in turn division of stem cells. If at birth their content is: 1 stem cell per 10 thousand, then by the age of 50 – already 1 stem cell per half a million, and by the age of 70 – one stem cell per million hematopoietic cells.

The process of obtaining stem cells for medicinal purposes is an expensive part of modern medical technology and therefore biologics are considered a valuable and elite medicine all over the world. Today, effective methods have been developed for obtaining stem cells from umbilical cord blood – blood residues in the umbilical cord and placenta after childbirth. Modern technologies of cell therapy make it possible to prepare these cells for the treatment of many diseases. The most promising way to create your own medicine for a person, which can be used in the event of a disease or the loss of an organ, is to keep your stem cells in a frozen state, collecting the remains of the umbilical cord blood during birth and using biological products created based on them.

When injected into a patient's body, stem cells find the affected organs, the so-called target organs, into which they migrate and provide a powerful



renewal of entire biological structures, normalize metabolic processes, adjust the immune status of the body, and activate antitumor factors. Thus, the introduction of a cell suspension into the body leads to an increase in the number of leukocytes in cancer patients with chemoradiation depression of hematopoiesis from 2 to 5 thousand in two weeks. Stem cells actively perform the most important role - they replace sick and old cells of a decrepit organism, rejuvenating it, which no medicine is capable of. The engraftment of the injected stem cells among the aging and pathologically altered cells of the body creates a non-repeatable situation when the most powerful factors of development, renewal and provision of functions that can be found in nature constantly begin to act on the cells and organs of the adult body.

**Cell therapy in its complex effect:**

- normalizes and stimulates metabolism;
- increases the activity of the immune and neuroendocrine systems;
- has a pronounced antitumor effect;
- delays premature aging, multifunctionally rejuvenating the body;
- has a pronounced therapeutic effect in a wide variety of pathologies.

The **essence of the method** of cell and tissue therapy is an active substitution and stimulating effect on functionally defective cells and tissues in individual organs and systems, stimulation of reparative and metabolic processes, immunocorrection and immunostimulation using stem cells. The developed technologies for the manufacture of stem cell preparations, cryopreservation and treatment are based on the provision on the need to preserve the viability of biological objects, i.e. the possibility of their functioning after thawing and introduction into the body, which ensures high clinical results. **The mechanism of action** of viable biological materials is based on the preservation of usefulness by stem cells after warming up and the presence in them of metabolically active substances of natural origin with a polypharmacological effect of a specific and non-specific orientation. **The advantage of cell therapy is** that the patient receives a number of biologically active, balanced compounds of natural origin that can affect various aspects of the metabolism of the whole organism, as well as stem cells that can perform replacement functions.

In Ukraine, the study and production of biological products from animal and human cells is carried out within the framework of state scientific programs under the auspices of the National Academy of Sciences, the Medical Academy of Sciences, the Ministry of Health, the Coordination Center for Organ, Tissue and Cell Transplantation of the Ministry of Health of Ukraine. Cellular or regenerative therapy has made it possible to obtain qualitatively new clinical results in various fields of medicine: gerontology, oncology, gynecology, hematology, immunology, endocrinology, cardiology, obstetrics, psychiatry, neurology and neurosurgery, etc.

## PHYSIOTHERAPY AND APPARATUS COSMETOLOGY

In this case, the introduction of positively charged ions from the positive field creates a positive field, which causes vasoconstriction, a decrease in the permeability of cell membranes, and the closure of pores. When a negatively charged solution is introduced from a negative electrode, an alkaline medium is formed in the cathode space, which increases the permeability of cell membranes, promotes the opening of pores, and expansion of blood vessels. The active substances of the injected agent penetrate to a depth of more than 1 cm. The period of elimination of substances from the skin depot is 3–20 days. In the case of anti-wrinkle gel, each wrinkle is treated with a finger electrode. The procedure is indicated for sluggish, atonic, oily, dry skin, the indications are determined by the properties of the injected substance.

**Disincrustation** – galvanization with alkaline solution from the negative pole to cleanse the skin of the face and soften the sebaceous plugs. As a disinfectant, a special preparation, desinkru-stant, or 3–5 % sodium chloride solution, 1–2 % sodium bicarbonate solution is used. Indications: oily skin, mixed skin, comedones. Galvanic baths are the effect of direct current on parts of the body immersed in water. Foot and hand baths are used. The water can be sea, fresh or mineral, it is possible to add various medicinal substances. Indications: aging skin, hyperkeratosis, for strengthening the nail plates.

**Darsonvalization** is the impact of a weak pulsed alternating current of high voltage and high frequency. It helps to improve microcirculation, stimulates metabolic processes, the secretory function of the skin glands, has an antiseptic effect, promotes tissue regeneration, and increases skin permeability. Indications: aged skin, fine wrinkled type of aging, acne, seborrhea, hematoma, alopecia. Microcurrent therapy-exposure to bipolar impulse currents of low strength and different frequencies, which corresponds to the physiological resonance characteristics of a person. Microcurrents act on the epidermis, dermis, hypodermis, blood vessels and muscles by stimulating the work of the ionic channels of the cell membranes. Promote the elimination of large coarse proteins, amino acids, lipids, the removal of metabolic products due to the lymphatic drainage action. They have an anti-inflammatory, detoxifying, myotonizing effect, promoting the emptying of the sebaceous glands, helping to relieve muscle spasms of facial muscles, increasing skin turgor, providing lifting, reducing tissue swelling. The use of microcurrents is recommended for aging skin (age-related dryness, correction of mimic wrinkles, restoration of the face contour, reduction of puffiness and puffiness of the face, prevention of rosacea), for cellulite (stimulation of lipolysis and lymphatic drainage), for adolescent and rosacea (acceleration of regeneration, correction of post-acne), oily seborrhea, edema, hypermelanosis, scars, for skin rehabilitation after chemical peelings, plastic surgery, microdermabrasion. The following programs

of microcurrent therapy are possible: microcurrent lymphatic drainage, microcurrent electrophoresis, microcurrent myostimulation, microcurrent muscle relaxation. Effectively combine microcurrent therapy with paraffin masks.

***Electroporation*** is the effect of a low-frequency electrical impulse that increases the permeability of cell membranes and facilitates the passage of biologically active substances of cosmetics into tissues. The procedure is accompanied by light vibration. Cosmetic effect: increasing skin tone, firmness and elasticity, improving skin regeneration, microcirculation.

***Electromyostimulation*** is the effect of an impulse current that causes a forced muscle contraction. Depending on the type of wave, amplitude and frequency, there are classical myostimulation (constant current), alternating current and microcurrent. Classic myostimulation has an insignificant effect on adipose tissue and a decrease in volumes after its application occurs due to the contraction and shortening of individual muscles. Alternating-current myostimulation effectively stimulates local lipolysis, which leads to the burning of fats and their active elimination from the body. Provides improvement of trophism, restoration of muscle tone, lymphatic drainage, silhouette modeling. The effect is a decrease in body volume, an increase in the general tone of muscles, giving a relief to a figure, strengthening of connective tissue and an increase in skin tone, activation of blood circulation with an increase in the outflow of fluid through the venous and lymphatic network, an increase in the intensity of metabolic processes and activation of protein synthesis. Indications -severe edema, early stage cellulite, obesity, plastic surgery, decreased muscle tone (for body shaping). Hardware lymphatic drainage-the impact on the striated muscles of the body with low-frequency interference alternating currents, microcurrent therapy, which cause tonic muscle tension and lymph outflow through the lymphatic vessels. Before the procedure, surge is carried out, pressing on different groups of lymph nodes 3–7 times from top to bottom to improve lymph outflow. After the end of the procedure, the lymph node surge is performed in the reverse order to close the lymph outflow path. Effects: stimulation of skin regeneration, cell nutrition, improvement of oxygen supply to cells, reduction of puffiness, stimulation of the immune system. It is achieved by muscle contraction, increasing the tone of the vascular wall, activating the vascular valve apparatus. It is indicated for the initial stages of cellulite.

***Phototherapy*** is the use of light for therapeutic purposes. Ultraviolet irradiation-the use of UV rays for the cosmetic purpose of obtaining a tan. In order to avoid complications, it is necessary to determine the phototype of the client's skin, correctly determine the exposure, cleanse the skin with cosmetics without photosensitizers, use protective pads, a lip protector and special cosmetics for tanning in a solarium. After sunbathing, you can take a shower or use an after-sun cosmetic product. Avoid taking systemic and local photosensitizers.

Effect: medium-wave UV radiation (305–340) synthesizing, vitamin-forming, tropho-stimulating, anti-inflammatory, desensitizing (erythral doses), immunomodulating (suberythral doses), long-wave (340–360) melanin-transporting, immunostimulating, immunostimulating Indications: insufficient pigmentation, decreased body resistance. Infrared light exposure. Infrared rays have a thermal effect, promote vasodilation and increase local blood flow. Thermal energy speeds up metabolic processes in the skin and subcutaneous fat. Infrared lamps, infrared cabins are used. Indications: cellulite, obesity, edema, dry age skin, acne infiltrates. Infrared irradiation can be applied before facial hair removal, electric and wax epilation. The method of selective photothermolysis is based on the selective absorption of certain structures of the skin of light waves of a certain length. The wavelength range absorbed by the main structures of the skin: Melanin – 615–900 nm, Oxyhemoglobin – below 615, Epidermis – 300–500, Water – 900–1200 nm. Intense Pulsed Light Technique (IPL, Selective Photothermolysis Method, Intense Pulsed Light System). The main targets are oxyhemoglobin, melanin and water (collagen). Light filters and sapphire crystal, xenon are used. A distinctive feature is a wide range of wavelengths, minimal pain and complications. The lamp generates a series of pulses of different power, gradually increasing the temperature of the object. A powerful pulse of light generated by a xenon lamp passes through filters, is transmitted by a sapphire crystal to a fluorescent filter that emits waves in the range of 535–1000 nm (in some installations 400–1000 nm). Indications: consequences of photoaging (hyperpigmentation, telangiectasia), hyperpigmentation – solar lentigo, freckles, melasma; manifestations of aging (wrinkles, sagging skin), rosacea, demodicosis, acne, vascular formations erythrocuperosis, flat angiomas, erythrosis of the neck, dyschromia, erythema resulting from laser dermabrasion or face lift, hyperemic, telangiectatic scars, hypertrophic scars and hypersensitivity striae, senile hemangioma; tattoo, for hair removal. It is not recommended to sunbath during the course of photorejuvenation; in the spring and summer time, it is necessary to use photoprotective cosmetics SPF 30. LHE (high energy photothermotherapy) – exposure to light with a wavelength of 400–1200 nm. Based on the use of a mixture of inert gases, the lamp provides both light and heat energy. No cooling systems required. It has an anti-inflammatory effect (infrared part of the spectrum), promotes the conversion of porphyrin (P. acnes) into active metabolites that destroy the bacterial wall, activates microcirculation and phagocytosis, activates metabolism and biochemical processes in the skin, selectively affects skin chromophores (melanin, oxyhemoglobin, collagen). Cosmetic effects: elimination of telangiectasias, hyperpigmentation, narrowing of pores, smoothing of wrinkles, scars, increasing skin tone and elasticity, improving and evening out the color and relief of the skin. Indications: removal

of hyperpigmentation, telangiectasia, senile keratosis, skin lifting, scar correction, incl. keloids, acne, hypertrichosis, hirsutism, ingrown hair. To allows you to remove dark, light and vellus hair. Laser therapy – exposure to monochrome (one wavelength), coherent (time-space phase), collimated (parallel waves) light. Low-energy lasers (therapeutic) - stimulate bioenergetic processes, promote tissue regeneration, improve microcirculation, stimulate fibroblasts, have a bactericidal effect (destruction of the membranes of microorganisms). Infrared and red lasers are commonly used. Red laser radiation is selectively absorbed by molecules of DNA, cytochrome oxidase, cytochrome, superoxidismutase, catalase. Stimulates cellular respiration, antioxidant system, enhances microcirculation due to vasodilation, helps to resolve infiltrative-exudative processes, accelerate proliferation. Infrared laser study is selectively absorbed by nucleic acid molecules, stimulates regeneration, promotes hyperemia. Indications: seborrhea, alopecia, acne, cellulite, telangiectasia, edema, aging skin. Chromotherapy-exposure to light in the visible spectrum. Light causes changes at all levels of exposure: subcellular, cellular, tissue, organ, systemic, and organismic. At the same time, blood circulation, hemodynamics, metabolism, the synthetic function of cells, and the level of energy exchange change. Non-selective chromotherapy is the use of integral visible radiation. With visible radiation, impulses are transmitted from excited visual receptors to the visual cortex of the brain. At the same time, the regulation of the photoendocrine system (hypothalamus, pituitary, pineal gland) occurs, the production of melanotropin increases. Visible light also induces heat generation in the skin. Effect: psycho-stimulating, antidepressant, hormone-stimulating, vasodilating, immunostimulating. Indications: decreased body tone, seasonal depression, sleep disorders. Selective claudication – exposure to monochromatic visible radiation (red, orange, blue, green). Red color has a stimulating effect, green – tonic, yellow – firming, blue – relaxing. Effect: tonic, sedative, harmonizing, metabolic, anti-stress. Indications: fatigue, various pathological conditions of the skin, sluggish wounds, etc. It is used as a photonic polychrome solarium, photonic matrices, chromopunker. It is possible to use chromocosmetics, colored essential oils. Polarized polychromatic light the use of semi-chromatic incoherent low-energy light. Effect: stimulation of metabolic, reparative processes, anti-inflammatory and immunostimulating action. Indication: prevention of aging, healing of skin defects, etc. Bio-thermal depilation is a combined effect of infrared radiation and enzyme preparations. When infrared radiation is absorbed in the surface layers of the skin, heat is released, which causes the expansion of the hair follicle ducts, where the molecules of the enzyme that destroys the hair follicle penetrate. Indications: hirsutism, hypertrichosis, ingrown hair.

**Sonotherapy** is the use of sound vibrations for therapeutic purposes. Ultrasound therapy has a mechanical, chemical and thermal effect on tissues. With continuous exposure, the thermal effect prevails, with impulse exposure - chemical and thermal. Ultrasonic waves cause microvibration in tissues, which enhances metabolism, activates macrophages, stimulates collagen synthesis and tissue regeneration, has an anti-inflammatory effect, depolymerizes hyaluronic acid. Cosmetic effect: reduction of tissue edema, lifting, resorption of fibrous foci with cellulite and scars. Ultrasonic waves with a frequency of 1-3 MHz reach a depth of 4 cm and have a defibrating effect, improve microcirculation, enhance the enzymatic activity of cellular and intercellular enzymes, accelerate tissue metabolism, enhancing regeneration, and promote the renewal of the fibrous structures of the dermis. Indications: seborrhea, acne, aging skin, cellulite, scars.

**Ulraphonophoresisthe** combined effect of ultrasonic vibrations and cosmetic or medicinal products introduced with their help, based on the ability of ultrasonic waves to increase the permeability of the skin. Promotes the passage of active ingredients through the stratum corneum. Special cosmetic gels for ultrasound and medicines are used (heparin ointment, interferon, hydrocortisone emulsion, lidase, prednisolone ointment, lokacorten ointment, contractubex gel, collagen hydrolyzate gel, aloe juice gel, gels with vitamins A, E, C, gels of the preparation of sulfur, elastin in the gel). Indications: determined by the injected agent. Ultrasonic hair removal is a type of phonophoresis. Introduction by means of ultrasound of substances that inhibit hair growth by slowing down the division of germ cells. It is used in combination with bioepilation, electrolysis. Ultrasonic peeling provides exfoliation of the stratum corneum of the epidermis, deep cleaning, ultrasonic micromassage, promotes the activation of microcirculation and metabolism. It is used as a comedolytic procedure, surface peeling, helps to smooth wrinkles, lightens hyperpigmentation. Indications: low skin turgor, uneven complexion, wrinkles, hypermelanosis, acne, comedones, oily seborrhea, scars, cellulite.

**Mechanotherapy** the use of mechanical action for therapeutic purposes. Endermology - vacuum-roller massage, in which the rollers of the working manipule can move in opposite directions, in the same direction and towards each other. The kit includes replaceable roller modules that differ in diameter and are designed for different areas of the body and for solving various tasks. The device produces a direct mechanical effect on the skin and subcutaneous fat: tissue aspiration, treatment of skin folds with rollers, vibration. The force of the vacuum supply, the speed of the rollers movement, the frequency of the vacuum supply, the direction of rotation of the rollers are regulated. This effect activates tissue metabolism, activates fibroblasts, accelerates lipolysis, enhances microcirculation, promotes the resorption of infiltrates, improves

tissue trophism, stimulates lymph flow, has immunomodulatory, sedative and analgesic effects. Cosmetic effect: exfoliation of the upper layer of the epidermis (improvement of the relief and skin color), improvement of microcirculation (blood, lymph, intercellular fluid), elimination of edema, improvement of regeneration, stimulation of the synthesis of the main components of the intercellular substance of the connective tissue (collagen and elastin), activation of metabolic processes (lifting effect), improving drainage, accelerating the elimination of fats and toxins (anti-cellulite effect, weight loss), increasing muscle tone (body shaping). Indications: grade 2-4 cellulite, obesity, lymphatic and venous edema, scars, loose skin, cosmechamics hard ware pulsating massage with special plates, which provides three-dimensional mechanical processing (vertical, horizontal and in the direction of movement of the handpiece). The manipula captures the skin fold with parallel plates, due to the pulsating vacuum initiates mechanical vibrations in the skin and underlying tissues. The device allows you to change the speed and frequency of movement of the working plates of the manipule. Promotes the improvement of microcirculation, stimulation of lymph outflow and tissue drainage, renewal of dermis fibers. Cosmetic effect: lifting, improving the contour of the face, reducing the severity of wrinkles and swelling, improving complexion, increasing skin tone, cleansing, narrowing the pores. Indications: aging skin (especially gravitational and mimic wrinkles), swelling and pastiness of the face, infiltrates and hematomas, seborrhea. Biomechanical stimulation (vibrotherapy) the impact of mechanical vibrations of low frequency and amplitude, carried out by direct contact of the vibration module and tissue. It is a combination of mechanical pressure and magnetic field. Smooth attachments are designed for massage, abrasive attachments for micro-grinding. Selective irritation of the skin mechanoreceptors (Meissner's little bodies and free nerve endings) occurs, which leads to the expansion of muscle-type vessels, increased blood and lymph circulation, activation of skin trophism and a decrease in muscle tone. Effects: deep relaxation, skin cleansing, comedolytic effect, increased skin turgor, decreased muscle tone (smoothing of facial wrinkles), lifting and correction of the face contour, drainage effect, improvement of microcirculation, activation of metabolic processes. Indications: aging skin (wrinkles, pastiness), seborrhea, comedones, oily skin, alopecia, cellulite. A combination of a vibration module with an IR source is possible.

**Barotherapy** the effect of pressure with a therapeutic purpose. Pressotherapy - simultaneous squeezing of the lower extremities with rhythmic air injection into a special suit in which the client's body is placed. The rhythm of air injection and pressure are set by the device. Effect: drainage action, improvement of microcirculation, as a result -reduction of edema, volume, detoxification. Can be combined with wrapping and the use of special

cosmetics. Indications: cellulite, lipodystrophy, correction of lymphatic edema, increase in skin tone and elasticity, body shaping.

**Vacuum therapy** (vacuum massage, vacuum cleaning, vacuum lymphatic drainage, vacuum spray). The use of vacuum massage enhances blood and lymph circulation, metabolic and trophic processes in tissues, promotes the resorption of scars. Promotes the emptying of skin glands, increasing local blood circulation. Indications: aging skin, cellulite, obesity.

**Thermotherapy** – the impact of thermal factors with a therapeutic purpose. Heat therapy is a hardware method based on the body's response to heat exposure. The heat factor helps to expand the skin glands and activate their work, increase blood circulation, activate metabolic processes, increase muscle tone and skin elasticity. It is used in thermo blankets, thermo mattresses, thermo sheets, electric saunas. Contraindications for most physiotherapy procedures in cosmetology are:

– pregnancy, dermatoses in the treatment area, intolerance to electric current or physiotherapeutic factor, fever, mental disorders, decompensated diseases of internal organs, chronic diseases in the acute stage, acute infectious diseases or chronic in the acute stage.

Selective contraindications depending on the applied technique combination of these changes; an increase in the entire deepening of the auricle or its individual parts; an increase in the angle between the earlobe and the head (normally equal to 30 °C).

## **AESTHETIC SURGERY**

Aesthetic surgery is a field of surgery dealing with changes in the appearance, shape and relationships of the anatomical structures of any areas of the human body, which (areas) should not significantly differ from the norm in appearance and take into account the age and ethical characteristics of a particular person. Cosmetic surgeries must be performed in strictly defined situations, in accordance with the decision of a competent specialist working in the field of aesthetic surgery and in such a way as not to harm the physical and mental health of the person. *The goal* of any cosmetic surgery is to improve a person's appearance as much as possible. Patients expecting a miraculous transformation in their appearance are likely to be disappointed. *The task* of cosmetic surgery is to eliminate deformation and restore the organ and social function of the body that has lost its shape or is affected. The implementation of these two main tasks is a specific feature of cosmetic surgery as an independent discipline. Correction of cosmetic defects requires surgical interventions, the prerequisite for which is the highest surgical erudition and knowledge of all the principles, methods and techniques of aesthetic surgery. Currently, this is the only section of surgery where the object of intervention is not a pathological



focus, a painful process, but a lack of appearance, which in itself is not a pathology in the usual sense.

**Contraindications to cosmetic surgery.** Depending on the specific conditions, experience and the surgeon's assessment of certain diseases of individual organs and systems, the degree of their severity and development, contraindications to cosmetic operations may be revealed. They can be absolute or relative. Absolute contraindications are severe cardiovascular diseases, arterial hypertension, diseases of the blood, endocrine system, pathology of the respiratory system (chronic pneumonia, pulmonary emphysema, bronchiectasis, tuberculosis, etc.), malignant tumors, kidney disease in an active form, liver cirrhosis, organic certain diseases of the nervous system, mental illness, diabetes mellitus, etc. Relative and at the same time general contraindications are accidentally identified or ultimately curable diseases or diseases with local localization (for example, acute respiratory infections, acute pneumonia, some skin diseases, etc.).

Cosmetic operations should be performed by people who are physically and mentally healthy.

**Facial cosmetic surgery.** Some of the most common cosmetic surgeries on the face are interventions to eliminate ptosis, excess aging skin and wrinkles on the face, chin, skin, forehead, upper and lower eyelids.

**Genioplasty** – chin surgery. Genioplasty consists in changing the outer contours of the chin by smoothing, removing or moving the bones that form its base. The term "genioplasty" is derived from the Greek words geneion - chin and plastes - sculpting. It is an aesthetic surgical operation aimed at improving the shape of the chin ridge, changing its size, and correcting congenital defects. The indications for surgery are the patient's dissatisfaction with the shape of the chin protrusion (underdeveloped or, on the contrary, a very prominent chin), the consequences of trauma and the asymmetry of the facial skeleton. Contraindications to surgery are uncompensated heart and lung failure and diabetes mellitus, an acute infectious process or an inflammatory process in the area of the operation. Plastic surgery of an underdeveloped (or sloping) chin is performed in order to improve the contour of the face (especially when looking in profile). There are two main methods of correction: implant placement and surgical lifting of the bone bridge.

**Aesthetic surgeries in the upper and lower eyelids** – cosmetic blepharoplasty occupies one of the leading places in the structure of rejuvenating facial surgery. With age, under the influence of gravitational forces against the background of aging of soft tissues, the eyebrows and periobital tissues drop, and fatty hernias appear. As a result of a decrease in the tone of the circular muscle of the eye, the ciliary edge of the eyelid drops, exposing the sclera below the pupil. With significant ptosis of the eyebrows,

the skin folds above the upper eyelid begin to block the field of view. As a consequence of this, the frontal muscles, the puckering eyebrow muscles, the proud muscle are hypertrophied. Permanent wrinkles appear on the forehead. The reason for the appearance of hernias in most cases is a decrease in tone (relaxation) of the supporting ligament of the eyeball with the advancement of the fatty bodies forward. In clinical practice, the following types of blepharoplasty are most commonly used:

Variant I. Classical quadrilateral, including the removal of excess skin, fatty bulges from the upper eyelid, as well as excess skin, fatty bulges from the lower eyelid. In some cases, a strip of muscle is removed. This operation is performed in elderly people (55–65 years old) and extremely rarely in younger patients.

Option 2. Bilateral upper blepharoplasty, during which excess skin (wrinkles) and adipose tissue in the upper eyelids are removed.

Option 3. Bilateral lower blepharoplasty, which involves removing excess skin and fatty hernias in the lower eyelid area.

Option 4. "Closed" blepharoplasty, which is performed from the transconjunctival approach with protrusion of infraorbital fat.

**Rhinoplasty** is one of the most popular and most difficult cosmetic procedures. Deformities of the nose are generally very frequent and varied. Cosmetic defects of the nose can be classified on the basis of various signs - clinical manifestations, etiological, clinical and anatomical picture, major congenital defects, etc. Due to the large number of existing options in all cases, any classification is the most general.

Visible deviations from the norm are manifested mainly in either excess or lack of tissues, deviations in the position, shape, symmetry and size of the nose. In this case, possible changes are localized in separate parts of the nose - in bone or cartilaginous structures. Of the possible combinations of various nose defects in cosmetic surgery, the following forms are most common: too large nose; large nose with a very large hump; large bowed nose with a hump; downward ("beak-shaped") nose; long straight nose with prominent distal part; wide "clown" nose, flat and sticking out forward; upturned nose of normal shape and size; upturned sharp nose; saddle nose with varying degrees and localization of the saddle failure; nose of normal size, but with one-sided or "S"-shaped curvature of the nose; large crooked nose; large, crooked nose; a long nose, deformed upward and to the side; small snub nose; other deformations.

During surgical interventions on the basis of the above defects, the following methods are used:

1. Correction of the shape, size and position of the nose.
2. Elimination of excess (excess) tissue.
3. Replenishment of missing tissues.

In the course of solving these problems, they simultaneously eliminate and normalize the corresponding functional disorders (elimination of the curvature of the nasal septum, restoration of normal nasal breathing).

**Surgical correction of the auricles (otoplasty).** Auricles belong to those elements of the face, deformities and defects of which are the source of the most frequent complaints in patients. Despite the fact that the ears are not directly related to the face, the auricles often have an adverse effect on the appearance. Auricles have a complex anatomical structure and shape. They often undergo changes as a result of deformations and defects of various nature and volume. In principle, almost all the disadvantages of the auricles are associated with their position, size and shape. The cosmetic surgeon must carefully analyze the deformity in order to establish its cause, choose a correction method and draw up a plan for surgical intervention. Most authors believe that the operation to correct the auricles should be performed when patients reach 5-6 years of age.

The main goal of cosmetic interventions for protruding auricles (lop-eared) is to create a normal shape and position of the ear, observing the following principles: a) elimination of the protrusion of the auricle, especially in the upper third of the ear; b) in the ear cavity, the curl should always be below (behind) the antihelix; c) it is necessary to maintain sufficient depth and correct position of the behind-the-ear fold; d) the ear should not be pressed tightly to the head, especially in boys; e) the position of both ears should be symmetrical and the difference in distance from the skull, when measured at the same points, should not exceed 3 mm; f) the earlobe should not go beyond the projection of the edge of the curl; g) The top of the curl should be 5 mm closer to the head than the middle of the ear. Variation in magnitude (large ears) is a relatively rare disadvantage. In contrast to this, small auricles are symmetrical, of normal shape and relief, do not create the impression of a flaw and do not represent a cosmetic defect. Shape changes. These changes are the most frequent and widespread. Coiled ears (a cup-shaped ear) is a congenital condition characterized by a rupture of the antihelix along its length in the upper part. The deformation is accompanied by the underdevelopment of the entire antihelix or its upper edge. Partial defects of the auricles, as a rule, are acquired, are very diverse and are the result of trauma. The localization of these defects, first of all, occupies the upper part of the auricle, less often the lower part and, extremely rarely, the middle part of the auricle. Usually, the corresponding cartilaginous elements are damaged, which determine the relief and size of the auricles. Surgical correction is difficult and involves several stages, including the restoration of missing cartilaginous elements and skin. Normally developed auricles can have various deformities of the earlobe (pads) – it can be: long, wide, bifurcated or deformed by cicatricial changes. With an overdeveloped

lower part of the ear recess, lobe separation is often observed. This cosmetic defect is corrected by excision of a part of the depression and antigus or by stitching the skin of the lobe with the skin of the mastoid process to reduce the gap between the lobe and the behind the ear space. Lip correction operations. Lips are a complex organ, a mobile organ that has an important physiological and aesthetic value in the formation of individual facial features, its expressiveness and beauty. Deformities and defects of the lips can be congenital and acquired (trauma and age-related changes). Operations on the lips require very high precision, especially in the area of the red border, in terms of maintaining symmetry. Incisions are made along the mucous membrane or along the skin at the junction of the skin into the oral mucosa. Double lip -the defect is observed mainly on the upper lip and is a hanging fold of the mucous membrane and its bulging on the surface of the lip. This defect is especially pronounced when the lips are opened and when smiling. Surgical elimination of the defect consists in elliptical excision of the fold along the entire length of the lip (Cupid's line). Misalignment of the corners of the mouth is usually caused by deformity or drooping of the corner of the mouth as a result of scarring. Correction is performed using Z-plasty according to Limberg. Age-related changes in the upper and lower lips are manifested by the formation of thin, often deep, vertical skin wrinkles. These changes, as a rule, are not eliminated by lifting the soft tissues of the face, they are corrected with the help of dermabrasion (skin resurfacing) or deep peeling. Dermabrasion and deep peeling in this area is possible in 3–6 months after facelift.

**Aesthetic breast surgery.** The breast of a woman and a man is that area of the body that is constantly undergoing visual assessment. From an aesthetic point of view, for a woman, she is a sign of femininity and plays an essential role in sexual life. Opinions about the beauty of the female breast are different, while the shape and size of the mammary glands are strictly individual. The reasons for their changes can be congenital and acquired. Polythelia and polymastia in women, often along the line of the nipple, up to the shoulder blades and down to the inguinal folds, additional mammary glands or nipples with areoles (rudiments) may be observed. Amastia is a congenital absence of mammary glands, often together with the nipple and its areola. Hypomastia, up to aplasia of the mammary glands, is of varying severity. The nipples and areoles are small and pale in color. This condition, when it is unilateral, is almost always accompanied by other changes (for example, the absence of the pectoralis major muscle, subcutaneous fatty tissue, changes in other tissues of the chest wall and upper limb). In such cases, compensatory hypertrophy of the second mammary gland is quite often observed. Acquired hypoplasia is the result of damage to the mammary gland in childhood as a result of trauma, inflammatory diseases, surgery, X-rays, and other causes. The mammary gland

is nipple (wart breast) can be unilateral and bilateral. Such gland contains a significant amount of glandular tissue in the complete absence of adipose tissue. The nipple is disproportionately enlarged and sharply protruded above the level of the mammary gland. The impression is created that the development of the gland has stopped, although its function is preserved. A significant and characteristic cosmetic defect of the mammary glands is their prolapse (ptosis), which distorts its beautiful original shape. Ptosis of the mammary glands is often accompanied by atrophy. These changes occur after lactation, gynecological diseases, metabolic disorders, fasting. They are caused by significant fluctuations in body weight, as well as loss of elasticity of the skin and ligamentous apparatus of the gland, and, undoubtedly, the influence of gravity (gravity). Hypertrophy of the mammary glands is practically the opposite of the glandular ptosis described above. Large in volume, even symmetrical in the position of the normal form, the mammary glands violate harmony if they do not correspond to the general appearance and proportions of the body. Hypertrophied breasts can be the cause of their prolapse - hypertrophic ptosis. This condition can manifest itself during puberty, with significant general obesity, during pregnancy, some endocrine disorders, etc. In addition to aesthetic consequences, hypertrophy is the cause of somatic complaints, painful conditions, such as spinal deformity with pain, edema of the lower extremities, varicose veins of the lower extremities, inflammatory, fungal skin diseases in the fold under the mammary glands. Hypertrophy can cause social, mental and psycho-logical problems, professional difficulties, the need to mow special linen and clothing. Any method of reduction mammoplasty involves the solution of three main tasks: 1) resection of excess volume of breast tissue; 2) elimination of prolapse (ptosis) of the nipple-areola complex; 3) removal of excess over-stretched skin covering the mammary glands. A breast lift (mastopexy) for ptosis can be performed with normal or reduced breast volume. However, in each specific case, a thorough analysis of the situation and a clear understanding of what the patient wants to get from the operations is required. Contraindications to mammoplasty are multiple scars on one or both mammary glands, severe fibrocystic mastopathy. You should refrain from surgery in women who are planning a pregnancy in the future. A large section of cosmetic mammoplasty is the correction of mammary glands with endoprotheses - augmentation (augmentation) mammoplasty. This type of breast correction includes five main areas: 1) implantation of alloplastic materials (paraffin, heel fat); 2) reconstructive mammoplasty due to transplantation of tissue sections of the patient; 3) implantation of biological allomaterials (endoprotheses) made from biopolymers; 4) the Vishnevsky method the technology of two-stage enlargement of the mammary glands (stage 1) implantation of a temporary endoprosthesis to form a capsule, the cavity of

which, (stage 2) after removal of the endoprosthesis, is filled with vegetable oil); 5) injection method the introduction into the tissues of the mammary glands of various semiliquid, gellike substances and their own adipose tissue. Many methods are of historical importance today. Currently, it is believed that augmentation mammoplasty (implantation of endoprostheses) is indicated for congenital aplasia, pronounced congenital asymmetry (Polland's syndrome, chest deformity), acquired deformity and postpartum hypoplasia of the mammary glands, not accompanied by ptosis or with ptosis of I–II degrees. Augmentation mammoplasty is also performed during surgical gender reassignment in transsexuals. Among the contraindications, one can single out general, local and psychological contraindications. General contraindications include diseases of the blood (disorders of its coagulation system), some endocrine diseases, as well as chronic infections. Local contraindications include fibrocystic diseases of the mammary glands, as well as inflammatory skin diseases in their area. It is inappropriate to operate on patients before the age of 18, women planning future pregnancy and childbirth. ***Correction of the anterior abdominal wall (abdomenoplasty)***. The main reason for stretching the muscle fascial layer and weakness of the skin of the anterior abdominal wall is pregnancy. The degree of residual changes after childbirth can vary from a roundly protruding lower abdomen, to laxity, stretching of the tissues of the anterior abdominal wall with often progressive ptosis of skin and adipose tissue, up to the formation of an "apron". This, in combination with diastasis between the rectus abdominis muscles and common stretch marks, is the main complaint of patients and a very strong argument for surgical correction of the anterior abdominal wall. Time and significant fluctuations in body weight further reduce skin tone and increase symptoms. With pronounced contour violations, only an operation can significantly improve the situation. The main indications are: the presence of stretching bands of the skin, located mainly in the hypogastric region, in combination with skin laxity; the presence of a skin-fatty "apron" in the lower abdomen; significant divergence of the rectus abdominis muscles; extensive skin scars of the abdomen in the lower sections. The most common general contraindications include: the presence of scars of the anterior abdominal wall located above the navel (for example, after cholecystectomy); they negatively affect the blood supply of the flaps allocated during operations; excessive thickness of the subcutaneous fat layer on the anterior abdominal wall, which significantly increases the likelihood of postoperative complications. In addition, there are factors that make abdominal surgery unreasonable or premature: the patient's intention to lose weight in the future, which worsens the result of the upcoming operation; possible pregnancy, which will lead to the loss of the achieved result; the presence of common diseases (diabetes, scleroderma, endocrine disorders, heart damage, etc.).

*Liposuction or suction-assisted liposuction (SAL)* is an effective modern method of surgical correction of body contours by suction (aspiration) of excess subcutaneous fat in various areas of the body, face and limbs. The current technique of SAL represents removal of fat using blunt-tipped hollow cannulas connected to a closed suction system. The main indication for liposuction is the presence of local forms of obesity (including lipomas) with violation of the contours of the body and cellulite. The most common deformity of the hips in the form of breeches occurs in women. This deformation is created by fat "traps" located on the outer surface of the thighs. Less significant in size, but no less important in their effect on the thigh line are fatty "traps" located on the inner surface of the knee joint. These "traps", as a rule, are combined with fat deposits located in the hips, pelvis, and abdomen. The main purpose of liposuction, performed for local forms of obesity, is to correct the contours of the body. At the same time, when discussing with the patient the possible results of the operation, the surgeon should emphasize that the main task of the intervention is not to create an ideal body, but to achieve a noticeable improvement in comparison with the initial state. In patients with significantly increased body weight, the fact that the task of liposuction is to correct the contours of the body, but not to reduce body weight, requires a separate explanation. In patients with generalized forms of obesity, if conservative methods of treatment are ineffective, performing one stage or serial liposuction can give good result.

Liposuction can be used for additional body contouring during other cosmetic procedures. When performing abdomenoplasty, liposuction allows you to achieve increased mobilization of the skin flap, reducing the thickness of the fat layer, as well as to remove fat in adjacent areas. Liposuction is also used in rejuvenating facial surgeries, reduction mammoplasty as an additional correction of fatty hypertrophy. Currently, there are several types of surgeries to remove fat cells, which can be conditionally divided into two large groups. The first group is liposuction (liposculpture), in which no technical means are used, but only a syringe and a set of instruments. The second group is an intervention in which mechanical and technical means, in most cases complex electronic devices, are used (vacuum suction, ultrasonic equipment, high and low frequency current generators and other equipment). Since the inception of the method of body modeling using liposuction, it has undergone a number of changes and modifications. Standard liposuction-vacuum aspiration by forward movements of the cannula (mechanical destruction of fat), with preliminary injecting with an anesthetic solution. Standard aspiration liposuction is the oldest liposuction method. It has two modifications: "dry" and "wet". In dry liposuction, the fat is broken up with a cannula and removed by vacuum suction. The cannula is in most cases made of steel, which can be Teflon coated. The

diameter of the liposuction cannula depends on the volume and location of the fat to be removed, as well as the experience and preference of the surgeon. Usually, for standard liposuction, cannulas with a diameter of 0.3–0.5 cm are used. During this operation, significant blood loss is observed, requiring adequate replacement therapy. This method is very traumatic and currently is used rarely, if ever, used. Wet liposuction differs from dry liposuction only in that the operation area is pre-infiltrated with a solution of local anesthetic with a vasoconstrictor. This helps to reduce bleeding during the procedure. This technique is still being used. It involves instillation of isotonic dilute epinephrine solution (with or without lidocaine) in volumes of 200–300 ml per area being liposuctioned. Superwet technique: this is commonly used. It involves instillation of isotonic (usually Ringer lactate-based), extremely dilute lidocaine (0.04–0.05 %) and epinephrine (1:1000,000–1:2000000) solution in volumes of 1–1.5 ml/ml of expected/projected fat aspirate per location. The solution is similar in composition to tumescent infusate; however, the solution is not the main source of anesthesia. In syringe liposuction, instead of an electric suction, negative pressure is created in the syringe to suction fat. It is used for surgical correction of small areas. The amount of fat removed does not exceed 100–200 g. per zone. Syringe liposuction has not become widespread. Tumescent liposuction is performed with a preliminary injection of a special solution under pressure, which has a vasoconstrictor and anesthetic effect and swelling of adipocytes. Tumescent liposuction differs from standard wet liposuction in that the preliminary infiltration of the intervention zone is performed with a special solution consisting of saline, soda solution, local anesthetic and vasoconstrictor drugs in an amount equal to the estimated volume of the aspirate. This technique is commonly used. It involves instillation of solution similar or the same as superwet solution but in volumes of either 3–4 ml per expected/projected fat aspirate per location or whatever volume is needed to bring tissues to a palpably turgid, hard state. In the classic tumescent technique, instilled solution is the main source of anesthesia. The advantages of such liposuction are its low invasiveness: during the operation, the patient loses little blood, less damage to blood vessels and less tissue destruction, a large selection of thin cannulas of various lengths and diameters also make it possible to simultaneously minimize trauma during the operation. Accordingly, rehabilitation is more comfortable. Large-volume fluid and local anesthetic agent instillation and extractions commonly seen in current liposuction procedures have created significant problems in fluid and drug management with cardiopulmonary and other complications. This situation requires both liposurgeons and anesthesiologists to be present and fully cognizant of the complexities of fluid and drug management. Ultrasonic assisted liposuction (UAL) and external ultrasonic assisted liposuction (EUAL)



are performed with pretreatment of the hypodermis with ultrasound. The latter technique remains controversial and of questionable value. In UAL, ultrasonic energy is applied to specially designed liposuction cannulas, causing cavitation of fat deposits in its direct path and surrounding its tip and leading to more bloodless, easier, and more efficient removal of fat. The technique is normally used in concert with standard SAL. UAL is performed first to break up and liquefy large areas of fat, and SAL thereafter removes liquefied fat as well as the remaining areas that require sculpting and removal. Ultrasonic liposuction has a number of advantages, since adipose tissue is destroyed not mechanically, but under the influence of an ultrasonic wave before it is removed, while the skin is minimally injured, and computer control of the strength of ultrasonic radiation, depending on the density of the surrounding tissues, minimizes injury to blood vessels and nerves. This prevents postoperative fibrosis and ensures a smooth skin surface after surgery. In addition, ultrasound stimulates skin contraction, even in cases of significant skin sagging after ultrasonic liposuction, its tightening ("lifting" effect) occurs.

The process of ultrasonic liposuction has three stages:

1. Infiltration of fatty tissue.
2. Emulsification of fat.
3. Removal of fat emulsion.

The directed energy destroys the fat cells, turning them into liquid, which is removed by vacuum suction. Liquefaction of adipose tissue can be performed using an ultrasound probe inserted under the skin (subcutaneous ultrasonic liposuction) or with a cutaneous emitter (skin ultrasonic liposuction). The method allows you to remove a large amount of fat. The disadvantages are the high price of the equipment and, accordingly, the increase in the cost of the procedure itself, as well as the danger of damage to the surrounding tissues by high temperature, internal tissue burns and, accordingly, the lengthening of the rehabilitation period. In modern devices, ultrasound energy is pulsating, so the risk of thermal side effects is reduced. Among the developments in ultrasonic-assisted liposuction is the so-called VASER technology, which uses a low-power ultrasound that produces a more selective fat cavitation with low risk of injury or burns to surrounding tissue.

Power assisted liposuction involves the use of a special device that promotes the advancement of the cannula in the tissues in order to greatly facilitate the physical efforts of the surgeon. The cannulas used in vibrational liposuction are attached to a special handle and move back and forth, and the handle is connected to a mechanical or pneumatic device that produces up to 6,000 translations per minute, which facilitates the movement of the hollow needle through the tissues. Destroyed fat cells are evacuated in the same way as

in traditional liposuction – using vacuum suction. Disadvantages of the method include vibration of the system, its weight and the noise generated by liposuction.

Electronic lipomodeling-the introduction of a special liquid and the suction of the resulting fat emulsion after the simultaneous action of a high frequency electromagnetic field, which occurs between thin needles inserted into the tissue. LEM (lipoelectromodeling, soft lipo modeling) - destruction of fat using high-frequency currents and removal it through small punctures. A special device generates a current of a certain frequency, the electrode supplying the current and the needle for suction of the liquid are on the same handle, the destruction of fat cells and the evacuation of the emulsified fat occur simultaneously. The handle design creates certain inconveniences for the surgeon, and the small diameter of the needle (up to 0.2 cm) limits the amount of fat removed and lengthens the operation time. The rehabilitation period is quite comfortable.

Laser liposuction with the destruction of fat mass using a laser beam (Nd: YAG) is performed to correct cellulite and remove excess fat in the cheek and chin area. The procedure has been marketed as SmartLipo, which uses a pulsed 1064-nm Nd: YAG system to help heat and possibly liquefy fat. Coagulation produced by the laser has been suggested as a possible benefit. When combined with traditional tumescent liposuction, the results appear to be similar to those achieved with tumescent liposuction. Treatment of large areas with this technique also appears to be cumbersome, and most surgeons have limited its use to small anatomic areas such as the neck. Cryolipolysis (CoolSculpting) involves freezing the fat at a temperature that is above the freezing point of skin. A 1-hour cycle of freezing can reduce, at 4 months, the volume of fat by 20 %. Secondary treatments can be performed 1–4 months after the first treatment. There is some to moderate discomfort in the first 5-10 minutes of treatment, after which most patients feel numb for the rest of the session. Multiple applicators overlapping the fat bulge have been shown to produce some very good results, at times similar to liposuction but without any surgery.

There is a relatively new treatment, known as injectable radiofrequency, or Thermitight, which has been used either in place of or in conjunction with liposuction. In this procedure, after local anesthetic is injected, a small cannula is inserted into the skin through a needle puncture. The fat is heated by radiofrequency energy, which not only causes the fat to melt but also results in adipocyte necrosis (cell death). ThermiTight creates swelling and bruising for a few weeks; as in liposuction, compression garments are used.

Liposuction technique provides for the observance of certain rules and has its own characteristics depending on the forms of fatty deposits and their localization. Immediately before the operation, the liposuction zone is marked in the vertical position of the patient. After infiltration of the area of

intervention with solutions and treatment with physical factors, fat is aspirated. The liposuction operation ends with the drainage of the intervention zones with rubber drains through the skin accesses, the application of bactericidal coatings and the wearing of compression underwear.

It should be noted that small-scale operations (liposuction in two to four areas) can be performed under local anesthesia. Liposuction of large areas (a large number of areas) requires general anesthesia. Liposuction of two to four areas can be performed on an outpatient basis, while more extensive liposuction requires hospitalization for 1–3 days. The postoperative period has a number of features that the patient should be informed about in detail. The early postoperative period is characterized by moderate pain, swelling and subcutaneous hemorrhages in the liposuction areas, as well as subfebrile fever and slight malaise. Change of stickers and removal of drains are performed the next day after surgery. It is allowed to take a shower 4 to 6 days after the operation. An important feature of the postoperative period is the presence of pronounced tissue edema, which patients may erroneously assess as "insufficiently" removed fat. Depending on the scale of the operation and the individual characteristics of the patient, the period of edema or "relative patient dissatisfaction" can last from two to four weeks, and sometimes even longer. It is fundamentally important to wear compression underwear for 2–3 months after the operation.

During the first month, it is recommended to wear compression garments around the clock, subsequently in the daytime. A complication of liposuction is uneven pumping of fat, skin irregularity, fat embolism, toxic shock syndrome, infections, hematoma or seroma, unacceptable scarring, sensory nerve impairment, contact dermatitis. Prevention – the use of compression underwear, special cosmetics.



**Навчальне видання**

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**Навчальний посібник**

Відповідальний за випуск

А. М. Біловол



Комп'ютерна верстка О. Ю. Лавриненко

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